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ABSTRACT

The reports from five countries participating at a seminar on teacher training in environmental education for Asia are compiled in this document. The objectives of the seminar were: (1) to familiarize teacher educators with the contents of the series of teacher training modules in environmental education prepared by the International Environmental Education Programme (IEEP); (2) to prepare prototype environmental education units for incorporation into teacher training programmes; (3) to identify institutions for local adaption and use of teacher training modules in participating Member States; (4) to identify activities and documents on teacher training in environmental education to be undertaken by IEEP at subregional, regional and international levels; (5) to enhance exchange of information and experience in the development of teacher training in environmental education in the subregion. The countries presenting reports are: Indonesia, Malaysia, Philippines, Sri Lanka, and Thailand. (DB)

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

UNESCO-UNEP INTERNATIONAL ENVIRONMENTAL EDUCATION PROGRAMME (IEEP)

COUNTRY REPORTS

Presented at

SUBREGIONAL SEMINAR ON TEACHER TRAINING IN

ENVIRONMENTAL EDUCATION FOR ASIA

Organized by

UNIVERSITI PERTANIAN MALAYSIA

in cooperation with

IEEP

15-22 November 1987
Serdang, Selangor, Malaysia

Opinions and views expressed in the Country Reports are those of the participants of the Sub-regional Seminar on Teacher Training in Environmental Education for Asia and do not necessarily reflect the official position of UNESCO.

PREFACE

The Subregional Seminar on Teacher Training in Environmental Education for Asia was organized by Universiti Pertanian Malaysia (UPM) in cooperation with UNESCO-UNEP International Environmental Education Programme (IEEP). The seminar was held from 15 to 22 November, 1987, at the Centre for Extension and Continuing Education of Universiti Pertanian Malaysia, Serdang, Selangor, Malaysia.

The objectives of the seminar were :

(i) to familiarize teacher educators with the contents of the series of teacher training modules in environmental education prepared by IEEP;

(ii) to prepare prototype environmental education units for incorporation into teacher training programmes;

(iii) to identify institutions for local adaptation and use of teacher training modules in participating Member States;

(iv) to identify activities and documents on teacher training in environmental education to be undertaken by IEEP at subregional, regional and international levels;

(v) to enhance exchange of information and experience in the development of teacher training in environmental education in the subregion.

Fifteen participants and observers from Indonesia, Philippines, Sri Lanka, Thailand and Malaysia attended the seminar.

The seminar was inaugurated by Dr. Leo Michael Toyad, the Honourable Deputy Minister of Education of Malaysia, and closed by Professor Dato' Dr. Nayan Ariffin, Vice Chancellor of UPM.

The following people served the Bureau of the seminar :

Chairman	:	Mr. Nagendralingam Ratnavadivel (Malaysia)
Vice-Chairman	:	Mr. N.S.R. DeSilva (Sri Lanka)
Rapporteur	:	Dr. Leticia Pojun Cortes (Philippines)

The Steering Committee of the workshop consisted of the following :

Chairman	:	Dr. Abdul Ghafoor Ghaznawi Dr. Kamariah Hj. Abu Bakar
Members	:	Mr. Nagendralingam Ratnavadivel Mr. N.S.R. DeSilva Dr. Leticia Pojun Cortes Dr. Sharifah Mohd Nor

Seven resource persons presented the six modules which were used as working documents. The titles of the working documents and as follows :

Environment Education	:	Module for Pre-Service Training of Teachers and Supervisors for Primary Schools (EE No. 5)
Environment Education	:	Module for In-Service Training of Teachers and Supervisors for Primary schools (EE No. 6).

Environment Education	:	Module for Pre-Service Training of Science Teachers and Supervisors for Secondary Schools (EE NO. 7).
Environment Education	:	Module for In-Service Training of Science Teachers and Supervisors for Secondary Schools (EE No. 8).
Environment Education	:	Module for Pre-Service Training of Social Science Teachers and Supervisors for Secondary Schools (EE No. 9).
Environment Education	:	Module for In-Service Training of Social Science Teachers and Supervisors for Secondary Schools (EE No. 10).

The deliberations of the workshop have been reflected in its Final Report.

Five country reports were presented at the workshop by the participants from Indonesia, Sri Lanka, Philippines, Thailand and Malaysia. This document is a compilation of all the country reports presented. It is reproduced and disseminated for the purpose of furthering exchange of information and experience in the field of environmental education. The country reports are presented in alphabetical order.

Kamariah Hj. Abu Bakar (UPM)
Abdul Ghafoor Ghaznawi (UNESCO)

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INTRODUCTION

This section reports the various aspects of the formal and non-formal Environmental Education programmes in the participating countries.

PRESENTATION AND DISCUSSION OF COUNTRY REPORTS

Major Environmental Problems That Were Identified

Pollution of the air, land and water, was the most common problem highlighted by the particpants from the Indonesia, Malaysisa, Philippines, Sri Lanka and Thailand. This was followed by the problem of the depletion of natural resources in all these countries. Another common problem was that of solid waste disposal. Coastal erosion and degradation are environmental problems in the Philippines and Sri Lanka. However, it is only in the Philippines where natural calamities such as typhoons, earthquakes, and volcanic eruptions are major problems. Indonesia reported rapid population growth problems and problems of technology.

Measures Taken for Solving Problems

Legislation was one of the means by which all the nations attempted to prevent and to solve environmental problems. In

Sri Lanka, for example, large numbers of birds, reptiles, animals and plants are protected under the Fauna and Flora Act. The Philippines has also passed laws with regards to the use of explosives and chemicals in fishing, and pollution by industry. In Malaysia laws regulating production of crude palm oil and raw natural rubber, and sewage and industrial affluents have been passed.

Various agencies have been established by these countries to coordinate and facilitate activities related to the conservation of the environment. For example, in Sri Lanka, agencies like the Central Environmental Authority, Sri Lanka Standards Institute, and the Urban Development Authority have been established. In the Philippines, the National Environmental Protection Council and the National Pollution Control Commission are such agencies.

Education is also viewed as one of the measures for solving and preventing environmental problems. All the participating countries have made attempts to introduce environmental consciousness through formal and non-formal education. Malaysia reported of a major curriculum change at elementary school level, while in the Philippines a master plan for environmental education is under preparation. Recreational facilities, parks, sanctuaries, marine parks, urban forestry and reserves have been established. This has been the case in Indonesia, Malaysia, Philippines and Sri Lanka.

In relation to forestry and soil erosion, these nations have launched reforestation programs. There have also been attempts to bring about proper disposal of solid wastes.

CURRENT FORMAL AND NON-FORMAL ENVIRONMENTAL EDUCATION PROGRAMMES

Formal Environmental Education Programmes

All the countries reported to have integrated environmental courses in their curriculum. In the Philippines, it is integrated in the science and social science subjects. In Sri Lanka, at the primary school level, environmental education is taught as an individual subject entitled "Social Studies". In Malaysia a major curriculum reform at elementary school was reported where a new subject entitled "Man and the Environment" has been introduced from grade 4 to 6 to replace the classical subjects of science, health, history, geography, and civics. However, at the secondary school level it is integrated into almost all subjects. In Indonesia, it is integrated in all levels of formal education with greater integration in science, social science, and population education.

The main objective reported in the integration of the environmental education component in the curriculum is to inculcate positive values and attitudes toward environmental conservation in the students from a very young age as to develop knowledge and understanding of the environment.

The approaches to environmental instruction at the pre-school and primary school levels in Sri Lanka, Indonesia, and Malaysia give the child first-hand experience with the environment. In Sri Lanka, at the secondary school level, environmental concepts are developed through students' personal investigation and analysis of second hand data. In the Philippines, the strategy is to demonstrate and illustrate the importance and relevance of the scientific approach to the environment and its conservation.

The most serious problem encountered in the implementation of formal environmental education was that teachers are not adequately qualified or professionally trained to teach environmental education. Urban schools lack suitable natural environments. The problem of lack of resources and overcrowded classes were also reported.

Non-Formal Environmental Education Programme

In all countries, non-governmental organisations are involved in non-formal education programmes. However, in Malaysia, many government departments are involved in non-formal education programmes. The main objectives reported are to inform the general public of the importance of environmental management and the need for the prevention and solution of environmental problems as well as to create public awareness of environmental conservation.

Various approaches to implementation were also reported. In the Philippines, newsletters, brochures, brief reports, surveys and investigations of environmental conditons are produced or conducted. Workshops, conferences and seminars of the same nature pertaining to certain environmental concerns are also held from time to time. Sri Lanka has various important environmental education programmes in operation such as those conducted by the Field Studies Centres programme, the Science Education Support Centres programme, the Committee for the Popularization of Science, the Non-Formal Environmental Education Programme conducted by the Central Environmental Authority, etc.

The government departments in Malaysia that are involved in non-formal education programmes include the Department of Environment, the Wildlife and National Parks Department, etc. These departments provide publications and educational materials and other informative talk sessions.

In Indonesia, the non-formal environmental education programme is usually carried out by non-governmental organisations although governmental institutions sometimes do get involved.

Problems encountered in the implementation of non-formal environmental education were reported to be of similar nature in all participating countries. These include: shortage of financial resources and trained personnel, lack of expertise to

formulate comprehensive environmental education action plans at the local level that cater for various target groups, and shortages of facilities in schools. Malaysia specifically mentioned that environmental education programmes have yet to attain a high priority amidst competing priorities of economic and industrial development.

PRE-SERVICE AND IN-SERVICE TEACHER EDUCATION IN ENVIRONMENTAL EUDCATION

Pre-service Teacher Education

Pre-service teacher training programmes in Malaysia, Philippines, Sri Lanka, Thailand, and Indonesia include an environmental education component at both the university and college levels.

In the Philippines, the pre-service teacher training course is a 2-year certificate programme (Certificate in Elementary Education), preparing students for teaching in the elementary school, with environmental dimensions incorporated in the science subjects, or a diploma programme (Bachelor of Science in Education), preparing students for primary/secondary school teaching giving particular attention to the environmental dimension.

In Malaysia, courses specifically on environmental concerns offered at the University level are elective courses in Environmental Education (Level 1 : Post Graduate Diploma of

Education at Universiti Malaya) with emphasis on environmental awareness; and Environmental Health (a 2-credit hour course at Universiti Pertanian Malaysia) aiming at understanding the relationship of man and his physical and non-physical environments. At the college level, environmental dimensions are incorporated in subjects like Man and the Environment, Geography, Health and Moral Education, aand co-curricular activities.

In Indonesia, pre-service teacher training is done through the Teacher Training School and Institute of Teacher Training and Education (ITTE). At the Teacher Training School level, Environmental Science and Issues are integrated into subjects like Science, Social Science, Pancasila Moral Education, Religious Education, and at the ITTE, environmentally related courses are offered, especially by the Biological Education Department.

In Sri Lanka, organisation of pre-service teacher training is based on two major criteria: the school level at which the teacher teaches, and the subject areas taught by the teacher. In the Colleges of Education, there are common compulsory programmes in the primary as well as the secondary teacher training curricula which include environmental components. The programmes are :

1. school and the community,

2. physiological foundations of education,

3. health and physical education.

Apart from these programmes the Science/Mathematics and primary curricula have their respective environmental components in their syllabuses.

In-service Teacher Education in Environmental Education

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In-service Teacher Education in Environmental Education

In-service teacher training programmes in environmental education are conducted by teacher training institutions and colleges, curriculum development centres and government agencies in Malaysia, Sri Lanka, and Philippines. In Indonesia, programmes as such are yet to be carried out since they are at the preparation and development stage in order to bring about an effective system. In Sri Lanka, in-service teacher training programmes are also conducted thorugh the Distance Education Programme, a 3-year activity-based science syllabus study as an alternative way of giving professional training to untrained teachers. In the Philippines, the public and private schools

conduct separate in-service training programmes but both include enviornmental conservation concepts. Generally, emphasis is on environmental awareness and implementation is through incorporation in the disciplines of science, health education, and social studies.

SUGGESTED PRIORITIES FOR PRE-SERVICE AND IN-SERVICE TEACHER EDUCATION IN ENVIRONMENTAL EDUCATION

The participants are generally agreed on the following:

1. Concerned curriculum developers should clearly identify the environmental problems and issues facing the country. For this purpose, expertise should be obtained from government and nongovernment institutions before curriculum content is finalized.

2. A training programme should be conducted for educational planners and curriculum developers in environmental education in order to make them fully aware of the environmental issues and problems in the various localities of the country.

3. The teacher educators have the reponsibility of giving the pre- and in-service teachers a thorough training to develop competencies necessary to meet the demands of environmental education. This requires the revision and renewal of teacher training curricula.

4. Sourcebooks, teacher's guides, activity manuals, self-training manuals, and resource materials in environmental education may be developed for pre-service and in-service teachers for primary and secondary schools.

5. A network of various groups interested in developing environmental awareness may be established.

SUGGESTED STRATEGIES FOR THE INCORPORATION OF ENVIRONMENTAL EDUCATION INTO PRIMARY AND SECONDARY TEACHER EDUCATION

Following are the strategies suggested:

I. The need to educate both formally and informally the nation on matters pertaining to the environment should be given a very high priority.

2. Teacher training is recognized to be a significant area for action in achieving the objectives of environmental education. Environmental Education programmes should be extended to all teachers colleges and included in their curriculum.

3. All universities offering education courses should have environemntal education as a required subject instead of an elective.

4. More resource materials on environmental education as referred to in the preceding section are to be developed to enhance teachers' information, knowledge, and skills with respect to teaching/learning in environmental education.

5. Extension of period of in-service course for key personnel from the usual 1 week to 2 weeks to include many aspects of environmental education.

6. School-based in-service training in environmental education should be encouraged so that training could become related to the realities of the immediate environment.

7. Environmental problems at the community surroundings of the school should be identified and envrionmental educational activities should be planned around them.

DISCUSSION ON COUNTRY REPORTS

It was expressed that while industry is always seen as a source of environmental pollution, yet the government encourages industrial development. It was suggested that industry must get involved in suitable programmes aimed at fostering environmental awareness of the general public. Integrated effort between industry and the public is necessary so that the public would further understand the

role of industry and its effort in promoting environmental awareness. Examples of such close cooperation were found in the Philippines where IBM which produced and televised the film series, "Planet Earth" highlighting the relationship of man and his environment and Caltex which had sponsored national quiz shows on science and environmental studies.

Involvement of non-profit/non-governmental agencies in environmental education was also discussed and emphasised. It was revealed that membership into professional organisations have not been successful largely because of the fees imposed. The role of the NGOs in environmental education activities conducted by the governmental bodies was also discussed. It was clarified that in Malaysia members of NGOs are asked to sit in committees formed by the Department of Environment. The involvement of the NGOs, however, is mainly indirect in nature.

The testing and evaluation of the environmental dimension of teacher training programme, the teaching/learning elements of the curriculum, and the processes involved were discussed. Evaluation and its support activities are considered essential undertakings for a sound development of environmental education.

ENVIRONMENTAL EDUCATION FOR TEACHER TRAINING IN INDONESIA

By Mr. Wuryadi*

1. INDONESIA

Much effort has been put out to promote environmental education in Indonesia since 1974 and it was started when environmental management was considered to be one of the essential factors on decision-making of our development planning. Formal, non-formal and informal environmental education have been innoculated into our educational system for all levels right up to the tertiary level.

Environmental education has been considered as life-long education to promote not only awareness but also individual and social ability to manage at least their own environment.

Environmental education should invite wide participation and involvement in our society and should have a community effect. Environmental education should take into account the realistic conditions of our national and local environment as part of the course material instead of basic and general concepts on environmental structure and function. We tend to use the principle: learning environment for environmental education.

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* Senior Lecturer, Centre of Study of Population and Environmental Education, Institute of Teacher Training and Education, Yogyakarta, Indonesia.

Environmental education as a program to educate people, has at least 3 dimensions ot the program that should be done simultaneously:

* Long-term program, that involves formal, non-formal and informal environmental education and that deals with the objectives of awareness, basic knowledge, life habit, limited ability and skill to manage environment, rational behavior and responsibility.

* Short-term program, that involves law and regulation programmes and deals with the objectives of management of human institutions, safeguard of the future environment, protection of our endangered resources and control of the technology.

* Professional and Scientific Specialization program, that deals with the objectives of promoting professional ability and skill in environmental technology and engineering, environment management and scientific specialization on environmental sciences.

It seems to me that Environmental Education for Teacher Training could be categorized as the first dimension of Environment Education. It should be concerned with the future population quality and should build an inter-generation link of our environmental responsibility. We are facing the challenge of having a sustainable development. We are however aware that our

resources are limited and we possibly have an uncontroled growth of our population.

2. MAJOR ENVIRONMENTAL PROBLEMS IN INDONESIA

Environmental problems and issues arise increasingly mainly because of the growing of environmental awareness within the Indonesian society. Their awareness comes from their perceptions which are largely influenced by information from the media, i.e. newspaper, t.v., radio, and other media. They also get information from the open discussions with the non-governmental organizations and from the public services programs of the universities.

Major environmental problems in Indonesia were usually related closely to some other problems, i.e.:

2.1 Population Problems
- rapid growth of the population
- unequal space and age population distribution.
- about 80% of the population live in the rural areas and are mostly farmers.
- rural labor forces increase faster than urban labor forces.
- less educated people more than the educated.
- urbanization getting more and more rapid

		- rural life-style invading urban life.
2.2	The Problems of Technology and Culture	- individual and social life-style tend to be inefficient. - appropriate technology base on intensive labour is not easy to develop. - waste and pollution control technology are mostly hi-cost (imported technology). - most of the production technology tend to use capital intensive technology to gain efficiency. - clean technology is scare and costly. - waste re-utilization to gain efficient use of resources is just developing. - there are continual changes on values, behavior, and ethics of Indonesian society and togetherness is scare in urban life.
2.3	The Problems of Resources	- we are facing energy resources limitation and scarcity.

- healthy and unpolluted water supply is scarce.
- in Java, Madura and Bali we have limitations on land and space.
- out of Java we have primitive land-use and management (e.g. mobile and land-field in forest)
- tropical forest deterioration is being accelerated

2.4 The Problems of Environmental Health

- domestic wastes require treatment
- the ground-water borne diseases tend to spread in most urban environments
- effects of air and water pollution diseases are increasing but the serious effects are not detected yet.

2.5 The Problems of International Pressure

- export and international market oriented system will influence the resource exploitation and utilization
- unstable international conditions will influence the rate of growth of the production system

- the primary production system is still dominant in our production system
- international pressure tend to stimulate the high-risk waste production in our industrial system.

It seems to us now, that technology alone will not solve the problems effectively, unless we increase the quality of human resource and human institution. The better the quality of human resource and institution, the probability is better for the creation of new and appropriate technology for national and local needs and conditions. Based on these considerations, possible fundamental solutions could be :

- To educate and train everyone according to their age and possible involvement in the environmental management program (national or local).
- To have regulations and law enforcements for everyone and every human institution according to their responsibilities in the environmental management program.
- To ensure that Environmental Education for Environmental Specialists and Environmental Engineers should be focused on the development of waste treatment technology and efficient energy technology.

- To develop basic environmental science education for the kindergarden, primary and secondary schools, requires proper teacher training.

- To urgently reorient resource exploitation and utilization according to the needs of future generations.

- To implement the concept of eco-development for all developmental activities (planning to implementing).

- To implement appropriate technology for re-utilizing agricultural and domestic wastes.

3. CURRENT FORMAL AND NON-FORMAL ENVIRONMENTAL EDUCATION PROGRAMMES IN INDONESIA

In Indonesia, formal education is carried out in the school system, i.e. kindergarten to the tertiary level of education. In this system, environmental education is included in the curricular system in various ways, according to the needs or objectives of the system.

From kindergarten up to the senior high-school, an explicit environmental subject matter is not present in their curriculum. Environmental knowledge and issues should be moulded in integrated ways to the existing subject matter. But this is not a simple thing, it needs very complex and careful considerations.

In kindergarden, this problem is easier to be solved. The children is playing in the environment, and while playing, the teacher introduce to them the environmental component, and its function for the children's lives. If the perceptions need to be broadened, then the teacher can invite the children to have a environmental trip. The teacher can tell stories with environmental themes, they can also show environmental pictures and relate the meaning to their lives. It forms the emotional basis of learning.

In the primary school, there is a need to introduce the logic of thinking, but still the emotional basis of learning is dominant. They have to be introduced to the way of scientific procudures, which at this stage are very simple ones, i.e. the ways of observing, data collecting and interpretating.

In the primary school, the environmental perception is very urgent and that could be the key to developing their understanding, and their willingness to learn more and finally the willingness to resort to environmental action, i.e. to form movements to ensure a clean and fresh environment. They can also have the willingness to make their own environment healthy and they have to study more about the cause of diseases in their environment. The other environmental activities for Primary School students are to collect solid domestic wastes, use simple technology that can be produced as bio-char and to be used as heat energy efficiently (by using efficient stove, what we so

call "Yohannes Stove").

In Primary School, Environmental Science is integrated into the subject matter: Natural Science (mostly), Social Sciences, and a little bit in Religious Education and Pancasila Moral Education. In some other subject matter, the Environment Science is taught on a moral basis, i.e. values, ethics and awareness, and this very much depends on the teacher's competencies. And this should be the essence of the teacher training, pre-service and in-service.

In the Junior Secondary School, the knowledge and ways of thinking, the procedures of scientific observations, and experimentations are getting more important to develop. More experience on observing different environments for comparison is another need, and the environmental actions should have a certain community effect. Individually, they will also have to improve their habits and attitudes toward healthy environment. More than that, as they grow older, they need to develop their concept of the environmental science.

For these purposes in the senior Secondary School, knowledge, concepts, understanding, scientific skills and skills to manage environment are to be increased. But instilling ethics, values, perceptions and awareness is still the other objective to be gained in the Senior Secondary School.

In general, the objectives of the Environmental Education are to develop the student's knowledge, understanding, perceptions, awareness, attitudes and rational behavior and the responsibility toward the interdependency between population growth and their environment in all aspects of human life. Their responsibilities have to be shown as the ability and willingness to manage their environment according to their age and opportunities.

The non-formal education dealing with the education outside the school, usually shows the involvement of the non-governmental organizations, but sometimes it is done by governmental institutions using the non-formal way. About four hundred non-governmental organizations participated in awareness programmes under the coordination of the WALHI (Indonesian Environment Forum). And about one hundred of these organizations were involved directly or indirectly, with environmental education and training. They also develop a limited skill for people in rural areas to manage their environmental problems, i.e. water supply problems, domestic waste treatment. and encouraging people to create appropriate technology, and solving other rural problems by using rural ways.

4. PRE-SERVICE PRIMARY AND SECONDARY TEACHER TRAINING

The Indonesia educational system of teacher training is two-fold i.e.

4.1 Teacher Training School (Sekolah Pendidikan Guru), a secondary level, and has 3 programmes of study:

4.1.1 Primary Teacher Training Programme

4.1.2 Kindergarten Teacher Training Programme

4.1.3 Handicapped Teacher Training Programme

All of these programmes have core and optional programmes The core programme seems to be the general basic subjects and educational basic subjects. For the 3 programmes of study, the core programmes are the same. The optional programme consist of possible option among specific materials method of teaching, and evaluation techniques.

Environmental Science and Issues are usually integrated into core subjects, especially Science, Social Science, Religious Education, and English (in the form of reading).

4.2 Institute of Teacher Training and Education (IKIP), a tertiary level, institution has 6 Faculties, i.e. :

4.2.1 Faculty of Education

4.2.2 Faculty of Mathematics and Science Education

4.2.3 Faculty of Social Education

4.2.4 Faculty of Language and Art Education

4.2.5 Faculty of Technology and Vocational Education

4.2.6 Faculty of Sports and Trainership Education

All of these Faculties offer compulsory courses which we call General Basic Course, and one of these GBC is Population and Environmental Education, as an integrated course and is usually

taught by team teaching (multidisciplinary and interdisciplinary).

In the Faculty of Mathematics and Science Education, especially in the Biological Education Department, there are some basic courses such as courses that are inter-related with Environmental Science, that is Ecology, General Biology, Climatology, Soil Biology, Radiation Biology, Tropical Biology instead of Environmental Science. These subjects are given to the students in graduate studies.

5. IN-SERVICE PRIMARY AND SECONDARY TEACHER TRAINING

In the formal institutions, in-service teacher training is still in preparation and development. Previously In-service training are for heads of schools. There are also intensive in-service training programmes for Population Education Programme for some school teachers (science and social science teachers).

6. SUGGESTED PRIORITIES FOR ACHIEVING PRE-SERVICE AND IN-SERVICE TRAINING OF PRIMARY AND SECONDARY SCHOOL TEACHERS IN ENVIRONMENTAL EDUCATION

6.1 Study intensively the curriculum of each school

6.2 Student's and Teacher's Readiness, Concepts and Understanding of Environmental Science and Issues

6.3 The Study of Local Possible Environmental Learning Resources

6.4 Identification of Environmental Problems at the Community Surroundings of the School

6.5 Planning Environmental Educational Activities (in integrated form)

6.6 Natural an Social Environmental Impact Studies and Assessment of the Proposed Educational Activities (as a result evaluation)

7. CONCLUSION

7.1 Environmental Education for Teacher Training is a strategic policy to develop a readiness of the society to participate in environmental programmes.

7.2 Environmental Education for Teacher Training is a long-term program which we cannot expect immediate results within a short time.

7.3 Environmental Education for Teacher Training need complex and various cooperation among environmental scientists and environmental educators.

STRATEGIES IN CURRICULUM DEVELOPMENT AND TEACHER TRAINING IN ENVIRONMENTAL EDUCATION

By

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1. INTRODUCTION

This country report was prepared at the request of the organizing committee of the Sub-Regional Seminar On Teacher Training In Environmental Education For Asia. The seminar is organized by Universiti Pertanian Malaysia in cooperation with UNESCO - UNEP International Environmental Education Programme (IEEP).

The seminar will focus on the various aspects of environmental education, with particular attention to the strategies in curriculum development and teacher training.

This report focuses on the major environmental problems of the country, their main causes and measures taken for their solution and prevention. This is followed by a discussion on the current

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formal and non-formal environmental education programme, objectives, approaches to the implementation, results obtained and problems encountered.

The greater part of this report attempts to elaborate on the pre-service and in-service primary and secondary teacher training in Malaysia pertaining to environmental education.

In concluding the report, the importance of environmental education and training in inculcating positive attitude towards maintenance of desirable environmental conditions will be highlighted.

In preparing the report, invaluable information and cooperation was obtained from other government departments in particular the Department of Environment, Ministry of Science, Technology and Environment. Assistence was also obtained from Non-Government Organisation and individuals involved in environmental education.

2. MAJOR ENVIRONMENTAL PROBLEMS IN MALAYSIA

The environmental, problems in Malaysia are varied. The area of concern is linked with resources. These problems are attributable to ignorance, arrogance, negative attitude and irresponsibility.

To tackle the problems there are at the present moment, 38 environment related laws in Malaysia. Among them is the Environmental Quality Act 1974 which has as its main objective the prevention, abatement, control of pollution and enhancement

of the quality of environment.

The environmental problems of major public concern in Malaysia and some suggested solutions and preventive measures are summarized in Table I.

Problems	Main Course	Solutions and Prevention Measures
1. Depletion of Natural Resources:		
- depletion of forest.	- excessive deforestation for timber edxtraction & conversation to agricultural land.	- conservation of representative forest types such as the establishment of Virgin Jungle Reserves.
- depletion of fisheries.		- enforcement of the National Forestry Act 1984.
- soil degradation	- overfishing especially by modern methods of trawling.	- Improved treatment of natural forest.
- water shortage	- pollution of inland waters.	- forest plantation and reforestation.
	- mining activities.	- introducing aquaculture.
2. Pollution of the Environment.	- discharge of untreated sewage into water courses, oil spills & discharge of waster near coastal areas.	- water pollution controls:
		- enforcement of the environment Quality (Prescribed Premises) (Crude Palm Oil) Regulation 1977.
	- mining & industrial effluents especially agro-based industries polluting rivers & inland	- enforcement of the Environmental Quality (Prescribed premises) (Raw Natural Rubber) Regulation 1978.
		- Enforcement of the Environmental Quality

		waterways. - indiscriminate dumping & disposal of solid wastes toxic &	(Sewage and Industrial Effluents) Regulation 1979. - Marine Pollution controls:
		hazardous wastes generated by industries. - Misuse of fertilizers pesticides & herbicides. - Particulate matter such as smoke & dust emissions from vehicular activities open burning of solid wastes. - high noise levels and ambient lead levels of concentration at busy main roads in urban areas.	Trafic separation Scheme since 1981 ensures Navigational Safety in the Straits of Malacca. - The National Contingency Plan become fully operational in 1984 aimed at marine pollution control. - Air pollution controls: - Enforcement of the Environmental Quality (Clean Air) Regulation 1978 which controls air pollution essentially from the stationary sources. - Installation of air pollution control devices in most factories to reduce emission or dust, black smoke and toxic gases.
3.	Problems associated with the disruptions of the ecosystem:		
	- soil erosion - sedimentation of rivers & coastal	- housing, land settlement, deforestation, infrastructure construction & logging.	- enforcement of strict specifications on road aligment and other infrastructure constructions.

	areas. - problem of water supply - floods. - endangered wild lifes.	- dam construction for irrigation & hydropower projects.	
4.	conservation of the environment.	- increasing urbanization leads to much greater need for recreational parks, as well as nature parks and greenery areas within the urban areas.	- Enforcement of the Protection of Wildlife Act 1972 aim for protection of endangered wildlife. - Establishment of Recreational & Urban Forestry, marine parks & reserves. - to date 84 recreational forest area have been developed in Peninsular Malaysia alone.

3. CURRENT FORMAL AND NON-FORMAL ENVIRONMENTAL EDUCATION PROGRAMMES

The aim of the current environmental education programme is to develop a population that is more aware of, and is concerned about the environment and its associated problem, and also to help acquire the knowledge, skills, attitudes, motivations and commitment to work individually and collectively towards solutions of current problems and the prevention of new ones.

Formal environmental education is provided for in schools, colleges and universities. With the implementation of the New Primary School Curriculum or KBSR (its acronym in the

national language), beginning from 1982 for 305 pilot schools and in 1983 for the other primary schools in the nation, a new subject called 'Man and the Environment' was introduced at Year 4. This is an integrated subject which includes elements of health science, science, social studies and civics. The subject is aimed at providing knowledge, and developing the right perception and attitude towards the environment in a holistic approach.

The secondary school curricula at present has incorporated certain aspects of the environment into various subjects such as Science (Integrated Science for Forms 1 - 3, Modern General Science for the Arts stream students in Forms 4 - 5 and Modern Biology for the Science stream students), Geography, Agaricultural Science and Health Science.

The recent developments in education has resulted in the New Integrated Secondary Curriculum or KBSM (its acronym in the national language) whereby environmental education is incorporated into subjects such as science and geography in which the major emphasis is for the students to understand and appreciate nature as well as to be responsible in the usage of natural resources and energy. These new dimensions in science and geography are expected to be taught in secondary schools in 1989.

At the tertiary level, Universiti Pertanian Malaysia (UPM) offers a Bachelor's Degree in Environmental Science. The

offers a Bachelor's Degree in Environmental Science. The University also offers a course leading to a Bachelor's Degree in Fisheries in which oceanography and marine pollution form part of the curriculum. In Universiti Kebangsaan Malaysia (UKM) and Universiti Malaya (UM), environmental studies form an option for graduates taking the Diploma of Education. Universiti Teknologi Malaysia (UTM) has an Environmental Engineering Department in the Civil Engineering Faculty offering courses which includes water quality management, waste water treatment, solid waste management and environmental quality control system.

Increasingly, many of the subjects in the engineering, science, social and applied science faculties taught in universities include the environmental dimension. Similarly, many research projects undertaken by the engineering and science graduates are environmentally oriented.

In additon, a large number of professionals and academicians have been or are being trained locally and abroad in specialised fields in environmental engineering, environmenal science and natural resources planning and management.

Non-formal environmental education and training activities on the other hand have been conducted by Government agencies as well as by universities, Non-Governmental Organisations (NGOs) and the private sectors.

The Department of Environment periodically publishes and distributes a magazine called 'SEKITAR' to the general public in generating and creating awareness on environmental issues.

Specific events such as World Environment Day are held annually throughout the country where relevant information, brochures and pamphlets on selected themes are distributed to the public together with posters and special messages to school children. Other activities include exhibition of photographs, paintings, posters with environmental themes; tree identification competitions; competition to pick the most well maintained local authorities and industries; debates and group visits by school children and journalists. The theme for this year's World Environment Day celebration in Malaysia is 'Know Our Environment'.

The Department of Environment organises seminars and training courses together with universities and other institutions including the NGOs on subjects pertaining to environmental menagement, environmental impact assessment, pollution control and abatement, air quality management, water quality management, industrial wastewater monitoring, operation and maintenance of wastewater treatment, state of environmental quality, noise pollution control, marine pollution control, solid waste management, toxic and hazardous waste management, environmental awareness and communication. The target groups range from decision makers, planners and managers to

engineers, scientists, architects and plant operators as well as the general public.

Apart from the Department of Environment, other Government Agencies, universities, NGOs and the private sectors also conduct non-formal environmenetal education activities. Amongst them are Government agencies such as the Wildlife and National Parks Department, Forestry Department and the Drainage and Irrigation Department who issue their own educational materials to the general public and organise talks and activities related to environmental topics particularly for school children.

The Ministry of Education through its Educational Television Division (ETV) include environment-related documentaries in their ETV programmes for school children.

Many NGOs including the Malayan Nature Society, Environment Protection Society of Malaysia, Friends of the Earth and various Consumers Associations have special publications of their own which feature environmental topics and are active in organising talks and seminars, exhibitions, and other activities related.

Since 1986, the Department of Environment has set up a National Committee to formulate a National Action Plan on Environmental Education and Training for the next 5 years on the theme, 'Sustainable Development'.

Achievements

There has been some progress in terms of greater public involvement in environmental debates and action has increased. Support, both at scientific and grassroot levels for action to arrest environmental degradation had prograssively grown.

Environmental aspects have begun to be seen in clearer perspective in various sectors of development e.g. food and agriculture, health, industry and human settlements.

NGO's and citizen groups have helped promote environmental awareness among the public while the mass media has also successfully promoted environmental awareness through informed reporting and giving coverage to significant environmental issues and developments that occurred at the regional and international levels.

Problems and Constraints

Consciousness among many government agencies, the private sector and the general public to incorporate environmental considerations, though improving, is still at a low ebb.

Acceptance of this need to improve or conserve the environment is often hampered by the following problems and constraints :-

1. Shortage of financial resources, trained personnel, and environmental education materials and equipment.

2. The lack of expertise to formulate comprehensive environmental education action plans that cater for the various target groups.

3. The low priority accorded to Environmental Education programmes amidst competing priorities in economic and industrial development.

4. PRE-SERVICE PRIMARY AND SECONDARY TEACHER TRAINING

The Institutional Infrastructure and Academic Level of Pre-Service Primary and Secondary Teacher Education

The Institutional infrastructure and academic level of preservice primary and secondary teacher education in Malaysia can currently be categorized into two distinct levels.

a. **The University Level** : Five of the six local universities offer courses in teacher education. The courses are eithter integrated with an undergraduate degree programme or conducted as a one year post graduate programme leading to a Diploma in

Education. The entry qualifications for the former would normally be the Sijil Tinggi Persekolahan Malaysia (STPM) with a stipulated number of Principal level passes ('A' level) or via a matriculation programme structure by the university concerned for suitable candidates with a creditable level of passes in the Sijil Pelajaran Malaysia (SPM). The latter requires a B.A., B.Sc. or B. Econs, from the same university or other recognised universities as prerequisite academic entry qualifications. Teachers who have undergone teacher training at the university level are categorized as graduate teachers and are normally involved with the teaching of upper secondary classes in Malaysia schools.

b. The College Level : Training at this level involves a five semester programme stretching over a two and a half year period. This is offered to secondary school leavers who must posses as a minimum, the SPM or the Sijil Pelajaran Vokasional Malaysia (SPVM) with a credit level pass in Bahasa Malaysia (National Language) and at least three other credits in subjects relevant to the course applied. However, for some courses the entry requirements are slightly relaxed but a credit level pass in Bahasa Malaysia is still a prerequisite. In addition the

candidates must also have passed the Bahasa Malaysia oral examination at the SPM level. Selected candidates undergo the 2 1/2 year teacher education programme at any one of the 28 teachers' colleges in Malaysia. This training programme produces two groups of teachers, namely :

i. Group A: those who follow the Primary School Teacher Programme (PSTP) which enable them to teach from Year One to Six in the primary schools.

ii. Group B: those who follow the Secondary School Teacher Programme (SSTP) which enable them to teach in the secondary schools, mainly Forms One to Three.

Training at the university level is organised and conducted by the respective universities through their departments/ faculties/schools of education. Each department/faculty/ school is headed by a dean who is answerable to the senate and council in the formulation, organisation and implementation of training programmes within his department/ faculty/school. The considerable autonomy exercised within each university is reflected in the differences in the programmes offered.

On the contrary, all teachers' colleges are placed under the direct jurisdiction of the Teacher Education Division (TED).

TEACHER TRAINING OBJECTIVES RELATED TO ENVIRONMENTAL EDUCATION

The objectives of the teacher education programme conducted by TED can be summarised as follows :

a) To produce trained teachers of high calibre in sufficient numbers to meet the requirements of all types of schools within the education system.

b) To produce teachers who are highly motivated:

i. to become active agents in efforts to build a united Malaysian nation dedicated to a democratic way of life:

ii. to inculcate in their pupils the spirit of Rukunegara (National Idealogy):

iii. to respond to the challenges of meeting the country's manpower needs through the development of human potential among the youths of the country:

iv. to foster aesthetic, moral, physical and spiritual development among the pupils so that they can lead full and meaningful lives.

The absence of a specific reference to environmental education in the objectives mentioned does not in any way denote any delibrate misgiving or an appalingly apparent ignorance vis-a-vis the value

and relevance of the subject in the designing of the teacher education programme's objectives and subsequently its curriculum. The reason for not focussing on environmental education is in fact based on the scale of preferences. Malaysia being a young and developing nation has to ensure that various important elements be included in its teacher education programme and the scale of preferences is by no means exhaustive. Hence certain immediate needs have taken preceedence. Immediate needs are invariably related to the school curriculum as designed by the Curriculum Development Centre, Ministry of Education. However environmental education has been introduced into the teacher education programme in Malaysia via infusion and integration for example, in 'Man and the Environment' and Moral Education at the primary level. Similarly content relating to environmental education has been infused into Geography, Agricultural Science, Health Education and Science at the secondary level. These will be dealt with elsewhere in the report.

Hence, the best indicators to the objectives related to environmental education in the teacher education programme are found in the objectives of specific subjects such as :

a) MAN AND THE ENVIRONMENT (Special Pedagogy course of PSTP). At the end of the training, teacher trainees would be abled to :

i. understand the concept of man and environment as the basic principle in the teaching of the

subject, 'Man and the Environment'.

ii. examine in detail the syllabus 'Man and the Environment' in the KBSR.

iii. acquire knowledge, skills and strategies for teaching and learning which would enable the teacher trainee to teach the subject, 'Man and the Environment' effectively.

iv. implement various aspects of planning and organisation related to teaching and learning so as to be able to take up the challenge as a teacher of, 'Man and the Environment'.

v. internalise and practice the role of a teacher of 'Man and the Environment' so as to continuously maintain and enhance the level of the teaching profession.

The content of the subject 'Man and the Environment' for primary schools has been designed from Year Four to Year by the Curriculum Development Centre of the Ministry of Education and its implementation in the formal education component of primary schools is implemented and coordinated by the Schools Division of the Ministry of Education with feedback from the Federal Inspectorate of Schools.

b) **GEOGRAPHY** (specialization subject for SSTP)

Objective (iv) of the syllabus reads as follows :

To increase the awareness that the entire environmental phenomenon interacts with one another to bring about an environmental balance and man should be responsible towards maintaining this balance.

At the university level the environmental education aspect vis-a-vis pre-service secondary teacher training programme is found in the following elective courses.

ENVIRONMENTAL EDUCATION (Level : Post graduate Diploma of Education at the Universiti Malaya). The objectives of the course are to create an awareness, among the teacher-trainees of the need for environmental education in the development of critical and responsible consumers and citizens; to equip these teacher-trainees with relevan information, skills and attitudes and to promote in the community at large a greater sensitivity to environmental problems. (Chelliah T. 1985 pp 118).

THE ENVIRONMENTAL HEALTH (a 2 credit course conducted by the Faculty of Educational Studies, UPM) aims at understanding the relationship of man and his physical and non-physical environments which is necessary to provide for the physical, mental, emotional and social well-being of the individual.

THE READING AND WRITING IN SCIENCE AND ENVIRONMENTAL STUDIES (1 credit) offered by the same university aims at training one to read and understand articles written by experts on specific topics and on science and environmental studies as well as the

writing of academic topics especially on Environmental Studies. Hence it is apparent that environmental education is by no means absent from the teacher education programme in Malaysia.

THE ENVIRONMENTAL EDUCATION DIMENSION OF TEACHER TRAINING CURRICULUM

To ascertain the environmental education dimension of the teacher training curriculum, it is necessary to look at the course contents of subjects specifically on environmental education or course contents that contain intergrated components of environmental education. This can be viewed at two levels:

a) **Universiti Level** : At the university level, environmental education course per se are offered at UM and UPM. UM offers the elective course Environmental Education (Level 1) Postgraduate Diploma of Education deals in detail with the following themes : the organism and its environment, development and the environment; curriculum development and integration of environmental concepts in the school subjects, and approaches to teaching environmental education techniques and methods. (Chelliah, T, 1985 pp. 118).

At UPM, the relevant paper is offered by the Department of Education and Social Studies of the Faculty of Educational Studies and the emphasis has been mentioned earlier in the report.

At this juncture it is necessary to take cognizance of the fact

that the post graduate Diploma of Education programme is entirely a professional course and students enrolled in the course have already obtained a basic degree. If the degree obtained is in the field of science (Botany, Zoology, Chemistry, Genetics and Cell Biology, Ecology, Biological Science or Chemical Sciences) or in Geography, more often than not the students would have been familiarised with certain aspects of environmental education. Similarly in an integrated degree course of Science with Education or Humanities with Education in the mentioned fields the academic content would have been imparted simultaneously or concurrently during the period of training. However it must be pointed out that what is imparted is the academic content and not the professional content vis-a-vis teacher training.

b) **College Level :** At the college level the content related to environmental education is found in the following subjects:

i. Man and the Environment (special Pedagogy PSTP)
ii. Geography (Specialization SSTP).
iii. Health Education (Specialization SSTP).
iv. Moral Education (subject for PSTP and SSTP non-Malay trainees)
v. Agriculture Science (specialization SSTP)
vi. Science Education (specialization SSTP)

i. **Man and the Environment**

In addition to providing training in the teaching and

learning strategies pertaining to the subject, this subject also deals with the syllabus taught in primary schools from Year Four to Year Six.

The aim of this subject is to bring about an awareness that man has to live in harmony with his environment in order to ensure continuous well being and prosperity. This will enable the students to function effectively in society and in their physical environment and simultaneously be able to nurture personal characteristics which are congruent with the principles of the Rukunegara (National Ideology). Hence the subject would be able to provide knowledge, awareness, understanding, appreciation and to develop sensitivity towards the environment. Beside acquiring and nurturing skills to obtain knowledge relating to man and his environment and related issues, the students would also be able to understand and solve problems pertaining to the subject.

ii. Geography

The overriding rational of the teaching and learning of geography vis-a-vis the teacher education programme is to ensure the acquisition of level of knowledge and basic skills which would enable the trainees to observe, understand, assess and analyse environmental phenomena. These phenomena involve the response and

accomodation of man to the physical environment, culture and endeavours to fulfil the necessities of their livelihood. Hence the study of geographical phenomena needs to be viewed in the context of dynamic and global changes.

iii. Health Education

Topics related to environment pollution and its effect on health are found in the content of the 'Health Education Syllabus' (specialization) in secondary school training. Factors influencing the growth and development of children (quantitative and qualitative aspects) including the influence of environment and society are also included in this subject.

iv. Moral Education

As in the case of all other school subjects, emphasis given towards acquiring knowledge and skills pertinent to the Moral Education syllabus in primary schools would be extended to the secondary school level with the proposed implementation of the KBSM. Amongst the universal values taught is cleanliness and it is here that awareness on environmental cleanliness in the home and school extending to the global concept is created. Though in terms of time allocation it forms a small portion is in no way of less significance than the other values taught.

v. Agriculture Science

The content of the syllabus in Agriculture Science which is offered as an area of specialization at the SSTP level includes topics related to the environment particularly in relation to plant and animal life and growth as well as the relationship between man and the environment.

vi. Science Education

The Teacher Education syllabus for science education deals with aspects pertaining to environmental education. Some of these include animal and plant growth and elements of environmental ecology.

From the course description given, it is apparent that environmental education in relation to pre-service primary and secondary teacher training is infused and integrated at two levels, namely the university level and the college level. The dimension dealt with is basically related to awareness of the environment and the role of man in the utilization and perservation of environment so as to maintain the desired equilibrium. The approach is rather indirect except for the elective course offered at the universities. At the primary level the source is predominantly in the subject 'Man and the Environment', whereas at the secondary level integration is done through various disciplines.

Environmental education is studies in the context of the socio-economic development of developing Malaysia. The need to strike a balance between the neede for development and yet ensure the preservation of environment seems to be the philosophy underlying the integration and infusion of environmental education in the teacher training programme in Malaysia. The thrust is mainly centered on the need for awareness of the interaction between man and his environment, specifically the influence of one on the other. This thrust is targeted at the teacher trainees who will in turn convey it to the young in schools who represent the future artisans of the nation.

The discussion on pre-service Teacher Training Programme on environmental education would be incomplete if co-curricular education is not mentioned. Since 1973, co-curriculur activities have been a compulsory and an important component of the teacher education programme (both at PSTP and SSTP levels). Co-curriculum activities fall into three different categories namely:

a. Uniformed units
b. Clubs and societies
c. Sports and games

Over the span of their training programme, students are required to participate in at least one activity from each of the three above categories. Of these, that which is related to

environmental education falls under the category of clubs and societies. The specific clubs/societies are as follows:

i. Consumer clubs

ii. Science society

iii. Outdoor Recreation Club

iv. Geographical Society

The exposure in the club/society is designed to enable them to acquire the relevant knowledge and skills related to the activities. This would consequently enable them to assist in the organisation and functioning of such clubs and societies when they are eventually posted as trained teachers to schools.

If the curriculum deals with the dimension of awareness, co-curriculum deals with that of imparting practical knowledge on organisational and management skills pertaining to activities on environmental education.

Environmental Education Teaching Materials and Evaluation Teachniques Utilized for the Training of Teachers

Teaching materials and evaluation techniques utilized for the training of teachers in environmental education are invariably linked to the strategies employed in the teaching of the components of environmental education as contained in the pertinent aspects of teacher education curriculum discussed

earlier. The main strategies employed can be briefly categorised as follows :

i. Lecture Method

ii. Discussion

iii. Projects

iv. Simulation

v. Demonstration

vi. Brainstorming

The above mentioned strategies require appropriate teaching materials for effective learning to materialise. The materials can be found in the following forms:

a. Books

b. Articles

c. Journals and Magazines

d. Research findings - published and unpublished

e. Audio-visual aids such as audio cassettes and video tapes

f. Conference Papers

g. Materials obtained by interviews

h. Self-learning modules

i. Talks on environment

The said materials can be obtained from various sources such as

i. Libraries

ii. Government Agencies such as the Department of Environment and the Department of Wild Life and National Parks.

iii. The NGOs/volunteer citizen groups.

Both the government agencies and non-governmental agencies provide resources in the form of reading materials based on empirical findings, talks and practical demonstration in seminars or forums.

However it must be emphasized that there is still a pressing need to produce teaching materials which are more specific and which would contribute effectively towards the students attempt to comprehend, evaluate and solve problems pertaining to the environment. The onus of obtaining and utilizing whatever teaching material that is available is on the teacher trainer. However with some concerted and co-ordinated effort amongst the divisions of the Ministry of Education, other government agencies and non-governmental agencies, the problem of adequate teaching materials can be effectively surmounted.

The evaluation techniques utilized at the college level can be categorized as :

a. Formative Evaluation - course work in the form of assignments, project papers and short tests.

b. Summative Evaluation - examination, particularly in areas of specialization at the college level.

For areas of specialization, the weightage for evaluation is based on 60% - 40% ratio between course work and examination. At the PSTP level, the evaluation for 'Man and the Environment' is formative (course work) and stretches over four semesters. The breakdown for each semester can be briefly summarised as follows:

Semester 1

60% for group assignment (4 students to a group)
40% for an objective test (40 question, 1 hour)

Semester 11

100% on group assignment related to lesson planning and the preparation of teaching aids for Year Four (3 students to a group).

Semester 111

100% on group assignment similar to that in Semester II but related to Year Five and includes the formulation of test items (3 students to a group).

Semester IV

100% on group assignment similar to that in Semester 111 but the formulation of test items is replaced with the compilation of records on student performance.

At the university level evaluation for the course on Health and Environmental Education is by course work (assignment). Other courses at the University level are normally evaluated by course work and/or examinations.

5. IN-SERVICED PRIMARY AND SECONDARY TEACHER TRAINING

In-service teacher education has the overall aim of assisting the teacher to keep abreast of developments in knowledge, methods and teachniques in classroom instruction as well as in his/her various roles as a teacher. The process of self-appraisal and self-renewal by the teacher is an important factor in the planning and organization of in-service teacher organization programmes in Malaysia. This is to ensure that a high level of competence is achieved so that the teacher is able to fulfill his/her role in the promotion of quality education in the schools.

In-service teacher education programmes are on-going activities and national plans are drawn up on a long-term as well as yearly basis. Proposals and plans are usually prepared by the various division of the Education Ministry based on perceived needs. Implementation of the in-service programmes proposed is coordinated by the In-Service Education Coordination Committee of

which the Teacher Education Division is the secretariat. The proposals and plans are presented to the Central Curriculum Committee (CCC) which is chaired by the Director General of Education and having its members consisting the various Heads of Divisions. The committee studies the proposals in the light of the Ministry's needs and priorities. Cases which have far-reaching policy or financial implications are referred to the Education Planning Committee which is the highest policy-making body in the Ministry and is chaired by the Minister of Education himself.

Programmes are usually carried out by the various professional divisions of the Education Ministry, notably the Teacher Education Division (TED), Curriculum Development Centre (CDC), Technical and Vocational Education Division and the National Institute of Educational Management. The National Institute of Education Management is responsible for conducting courses to develop and improve management and organization skills of school principals and other administrators in the Ministry of Education. Other agencies involved in in-service programmes are the State Education Departments, District Education Departments, school staff, educational resource centres, local universities and teacher unions.

In this report, in-service courses for teachers related to environmental education only will be touched upon. The Teacher Education Division is at present conducting a one year Diploma course at the Sultan Idris Educational Institute, Tanjung Malim,

for qualified teachers and Environmental Education is being offered as an elective paper. Basically this course introduces the concept of the 'here and now' world. It encompasses issues around us and tries to address the simplistic attitude of man towards his environment. The course attempts to identify strategic planning models in the context of preserving, sustaining and conserving the earth in the state of equilibrium. Candidates are expected to undertake at least one outdoor activity throughout the semester.

To be able to take up the elective paper, a teacher must have at least one of the following prerequisites i.e.

i) a pass in either Geography or History at the STPM level;
ii) a pass in the General Paper/General Studies at the STPM level;
iii) a pass with credit in Science at the SPM level; or
iv) permission from the co-ordinator.

The Curriculum Development Centre has been conducting in-service courses with every curriculum revision for teachers who are called key-personnel i.e. selected teachers and officials from various states). The in-service programmes operates on the 'multiplier effect' principle whereby the key-personnel are trained at the central/federal level and they in turn train teachers at the state/district level organized by the various State Education Departments.

With the introduction of 'Man and the Environment' at Year 4, the key-personnel were given a on-week orientation course which

started in October 1984. The courses were conducted evey year and the last one was held in March 1987. Since this subject incorporates many aspects of envrionmental education through the various topics, therefore, a large part of the in-service programme emphasized on teaching-learning strategies and techniques to help teachers teach these topics effectively.

Besides using the usual lecture methods to expose the key-personnel to the philosophy, aims, objectives and the organizing principles of the new curriculum, workshops are conducted in order to assist participants in exchanging ideas and experiences, identify learning difficulties and develop instructional materials. Field work and micro-teaching were also part of the activities in the in-service programme.

For the secondary level, in-service courses were conducted for science key-personnel in the late 70's for Integrated Science and the three pure sciences. This was done to orientate them to the philosophy, objectives and new trends in teaching-learning strategies and methodologies. Since environmental education dimension has been incorporated into these science subjects wherever appropriate, the in-service course therefore has been programmed to include these aspects.

Lecturer from local universities were invited to give talks on various aspects of the environment which includes the ecosystem, aquatic and terrestrial habitats, man's activities and its effect on the environment, nature clubs in schools etc. Visits were also carried out to the Universiti Malaya's Field Study Centre at

Gombak and the Zoo Negara in Hulu Kelang, both situated in the state of Selangor Darul Ehsan. The intension was to give the key-personnel first-hand experience in carrying out field work on both the aquatic and terrestrial ecosystems as well as to study the various methods in teaching wildlife and their conservation to students.

With the emergence of the KBSM, special focus is placed on teachers' and teacher trainers orientation and the teachers' roles as effective agents of change in schools in order to fulfil the new curricular goals and objectives. In-service education is also directed toward the development of informed teachers who are able to apply, in their teaching, knowledge and experience in recent developments in education.

Apart from giving knowledge and skills, the new curriculum stresses upon the need to inculcate good values and attitudes among our school children so that they will become responsible citizens of Malaysia. In order to achieve this, emphasis is being given to the inculcation of good values and attitudes through the teaching-learning of almost all subjects in KBSM.

The aim is to make our school children realise and understand that humans were created to be the stewards or vicegerent of the world. In-service training therefore will be directed to teaching-learning strategies needed to teach these values through the various subject contents.

6. SUGGESTED PRIORITIES FOR ACHIEVING PRE-SERVICE AND IN-SERVICE TRAINING OF PRIMARY AND SECONDARY SCHOOL TEACHER IN ENVIRONMENTAL EDUCATION

However hard one may try, it is obvious that man cannot be divorced from his environment. Environmental problems and issues transcend all societies and the extent to which these problems have been or would be overcome depend very much on the awareness, attitude, skills, evaluative ability and willingness to utilise what the particular society possesses vis-a-vis the environmental issues involved.

Hence the prorities for achieving pre-service and in-service training of primary and secondary school teachers in environmental education would be firstly, to sensitize the teacher trainees to the environment as well as, to the related issues and phenomena. Secondly, adequate knowledge on environment phenomena should be imparted. Thirdly, a positive attitude should be inculcated amongst the trainees/teachers in viewing environmental problems, programmes and conservation measures. The education thus acquired should be practical oriented and should enable the trainees/teachers to participate and contribute positively towards the betterment of the environment. This should be implemented in the context of the existing curriculum related to environment.

Any future development of curriculum on environment should involve an interdisciplinary or multidisciplinary approach and should be holistic in treatment. This would enable the trainees/teachers to relate to the environmental problems and

measures undertaken to overcome the problems.

Strategies employed in the teaching of context related to environmental education should be more specific and relavant to the trainees/teachers enabling them to relate to the environmental problems and measures undertaken to overcome the problems.

In terms of teaching materials, there is a need to develop modules on environmental education which would serve to promote more effective learning. At this juncture it would also be appropriate to mention that although there are sufficient materials available, there is sadly a lack of usage of such materials. Hence, it would be advisable to look into the aspect of motivating teachers to utilize available resources. The move innovative ones can even produce their own materials of a cheap cost or at no cost at all.

7. Conclusion

The effectiveness of environmental education in teacher training depends very much on all concerned especially the teachers themselves. The subjects which have elements of the environment will have to impart not only the required knowledge and skills but more than that, the teachers have to internalize the affective domain of the subject matter being taught. In other words, the kind of teachers that we want must be able to disseminate knowledge as well as to be good examples to the students themselves where attitudes toward the environment is concerned.

In this way, we hope our students too, i.e. the future generations of Malaysia will be able to internalize and practice positive values and attitudes so as to create a society that is responsible and be able to care for the environment if not for the betterment of society but for the well-being of mankind.

References

1. Department of Environment. Ministry of Science, Technology and Environment, Malaysia, Environmental Quality Report 1981-1984.

2. , (1985), SEKITAR - 1985 Special Edition : A Decade of Environment Management in Malaysia.

3. Wong F.M, Environmental Legislation in Malaysia, Department of Environment, Ministry of Science, Technology and Environment, Malaysia.

4. Goh K.S. (1987) Environmental Education and Training in Malaysia, Country Paper at the Congress on Environment Education and Training, Moscow, USSR, 17-21 August 1987.

5. Abu Bakar Jaafar and Halimah Hassan (1985) Environment Problems in Malaysia - An Overview, presented at the work on consumers and Environment for Secondeary School Teacher, 27 October 1985.

6. Dr. Leong Y.K., Environment Problems in Malaysia, Universiti Sains Malaysia.

7. Bahagian Pendidikan Guru, Unit Kurikulum (1982), Latihan Perguruan Asas Tiga Tahun. Curriculum Unit, TED, (Mimeographed).

8. (1985). Latihan Perguruan Asas Mengikut Semester. Curriculum Unit, TED, (Mimeographed).

9. (1986), Latihan Perguruan Asas Lima Semester. Curriculum Unit, TED, (Mimeographed).

10. Bahagian Pendidikan Guru, Unit Kurikulum (1988), Sukatan Pelajaran Pengajian Geografi (BSM).

11. , Sukatan Pelajaran Alam dan Manusia (PSR).

12 , Sukatan Pelajaran Sains Pertanian (PSM).

13. , Sukatan Pelajaran Pendidikan Moral.

14. Education Planning & Research Division, (1985), Ministry of Education Malaysia, Education in Malaysia. Kuala Lumpur: Pelangi Indah.

15. Kementerian Pendidikan Malaysia (1982). Buku Panduan Am Kurikulum Baru Sekolah Rendah. Johor Bahru: Jabatan Percetakan Negara.

16. (1982). Kurikulum Baru Sekolah Rendah. Ipoh: Jabatan Percetakan Negara.

17. Chelliah T. (1983) Environmental Education In Malaysian Universities RIHED Occasional Paper Series, Maruzan Asia.

18. Chelliah T. (1985). Environment Training Programmes And Policies In Asia - An Overview. RIHED - FIVE Studies In Environmenmtal Education

19. Persatuan Pengguna Selangor dan Wilayah Persekutuan (1985). Pengguna dan Alam Sekitar Untuk Guru-Guru Sekolah Menengah.

20. Unesco, Bangkok (1980). In - Service Teacher Education: Developing Innovatory Strategies and Instructional Materials.

21. Teacher Education Division, Ministry of Education Malaysia (1986). Report On Teacher Education Survey Malaysia

22. Ministry of Education, Malaysia (1980) In - Service Education for Primary School Teachers In Malaysia, Country report at the Joint Innovative Project on In-Service Primary Teacher Education, Quezon City, Philippines 26 August - 4 September 1980.

23. Curriculum Development Centre, Ministry of Education (1979) Laporan Kursus Kakitangan Penting Sains Menengah 17 - 22 September 1979.

24. (1981) Laporan Kursus Kakitangan Penting Sains Paduan 2-7 November 1981.

25. Ministry of Education (1987) Secondary Education In Malaysia - Status and Concerns.

ENVIRONMENTALISM IN A DEVELOPING COUNTRY

By Miss Leticia Pojun Cortes (Ph.D)*

1. Introduction : Environmentalism in a Developing Country

The Philippines is presently facing problems of major proportions and the measures being taken to solve them, whether successful or unsuccessful, are bound to affect the environment in its present condition. The tumultuous events that led to the change in government (i.e. assassination of an opposition leader and the consequent economic de-stabilization from 1983 to 1986), the preoccupation of the present administration to assert its authjority through political measures (i.e. formulation of a new constitution and elections of national level officials) and military action against insurgents from the extreme left and extreme right, as well as the compelling need to give attention to the debt problem had temporarily deviated national attention from the degraded and still continuing degradation of the environment.

It is only in the last quarter of 1986 that the National Environmental Protection Council (NEPC) again

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sounded out a call to various sectoral groups to seek consensus and endorsement of two resolutions : (1) the creation of a central environmental agency, and (2) the promotion of citizen awareness and people participation in environmental activities. The three-day seminar workshop which came out with the above-mentioned resolutions also threshed issues, problems, and strategies relating to the following :

* current Philippine environmental profile;
* formulation of Philosophy of Filipino environmentalism;
* land use planning;
* critical life support systems;
* industrial pollution;
* environmental health;
* environmental impact assessment;
* environmental education;
* community participation.

II. MAJOR ENVIRONMENTAL PROBLEMS OF THE COUNTRY, THEIR MAIN COURSES AND THE MEASURES TAKEN FOR THEIR SOLUTION AN PREVENTION

The continuing study of the state of the Philippine environment conducted by the NEPC led to the classification of the following as major environmental problems of the Philippines : (1) coastal zone degradation, (2) deforestation and soil erosion, (3)

toxic and hazardous substances proliferation, and (4) solid waste disposal.

Coastal Zone Degradation. An intrinsic part of the Philippine environment, and recognized by environmentalists as a highly important and extremely rich resource is the coastal zone. Because of the archipelazagic nature of the country, it is one of largest in the world. Yet the state of conservation/degradation of the Philippine coastal zone has received little or no attention for most of the citizenry.

The National Environmental Protection Council has recently declared the coastal zone as a seriously threatened area of the Philippine environment. Indiscriminate use of dynamite and potassium cyanide for fishing, the gathering of corals for commerce, siltation of coral reefs with deposition of mine tailings, the encroachment of human settlements, industrial development, and the conversion of certain coastal areas into fishponds are destroying the coral reef and mangrove ecosystems on the coastal zone. The effect of the destruction has already been observed in the decline in fish harvest. According to a study made by the University of the Philippines Marine Biology Department only 55% of the coastal zone remains in excellent condition.

The Bureau of Mines now requires mining companies

to stabilize slopes of mine tailings dumps with trees to prevent gullying, washing away or sliding into the sea. It is against the law to use dynamite and potassium cyanide. However to date no real policing of compliance to this requirement and observation of the law have been conducted.

Deforestation and Soil Erosion

The latest figures released by the Bureau of Forest Department in 1982 indicated that about 11.2 million hectares of land or 37% of the total land area is still covered with forests. About 77% of these forests is of the dipterocarp type, 2% is mangrove forest, 2% is pine forest, 15% is mossy forest, and 4% is man-made tree plantations.

The major causes of forest destruction are forest fires, illegal logging, and increase kaingin (slash and burn practice) due to population pressure in that order of severity. The effects are observed in the reduction of water yield from watersheds, soil erosion which includes the more readily observed landslide and mudslide, flooding of the low areas and reduction in the number of mature trees cut.

Government-sponsored seminar-workshops on forest resource management have been and are still being conducted in many places in the Philippines. The NEPC, cognizant of the

dollar learning value of timber as an export product is pressing ever more for the integration of ecological concerns into the Philippine Development Plan.

The only rational long term measure is, of course, forest renewal or tree planting.

Solid Waste Disposal in Urbhan Centres

There are two main urban centers in the Philippines and they are Metro Manila and Cebu. The solid waste of Metro Manila accumulate at the rate of 1/2 kilo per person per day. With a population of 8 million, the expanded city is generating 4 million kilos of solid wastes daily. Add to this amount the waste from industry; the city is literally saddled with mountains of difficulties.

No equivalent study has yet been made of Cebu. But crowded human settlements and the lack of a suitable disposal system leads one to surmise that its problem may be just slightly less than that of Metro Manila.

New dumpsites in both cities are difficult to find. In recent months, residents near chosen dumpsites have sent appeals to local officials to desist from their plans. The Metro Manila Mayors have taken to making appeals on television for the residents to separate the biodegradable and combustible waste from those which are not in order to make available to scavengers the recyclable waste.

Air and Water Pollution

The most flagrant polluters of air and water are factories and transport vehicles. In Mertro Manila there are over 15,000 manufacturing companies comprising about 18.24% of industry in the country. These factories discharge sulfur dioxide, particulate matter, carbon monoxide, and hydrocarbons into the air. Motor vehicles emit carbon monoxide, hydrocarbons, and oxides of nitrogen into the air.

An estimated 78 to 284 million tons of sulfur in the form of sulfur dioxide and about 20 to 90 million tons of nitrogen in the form of nitrogen oxide are released yearly into the atmosphere. The result is acid rain which end up in lakes and rivers. The acid rainwater dissolves more metallic substances on its way to the rivers and lakes thus increasing the content of toxic substances in this bodies of water.

In addition liquid industrial waste from residues and untreated sewage are directly released into water bodies. It is not surprising, therefore, to find the major rivers of Metro Manila more severely polluted than most other rivers in the country.

The government has taken measures to control the dumping of toxic chemicals and waste materials in various waterways. In 1984, the National Pollution Control Commission (NPCC) conducted a survey to determine compliance of industrial forms with water pollution control requirements.

A total of 6521 firms were included in the survey. Of these number 1057 firms or 16.20% were found polluting their nearby waterways. Only 734 firms or 11.25% had complied with the installation of wastewater treatment plants. In view of this finding, the NPCC recommends more incentives to industries for installation and use of pollution control devices. Since 1984 the NPCC had been intermittently apprehending smoke-belching vehicles. Because of lack of consistency in enforcing pollution laws there has been little change in the extent and severity of both air and water pollution.

Natural Calamities: Tropical Cyclones, Earthquakes, Volcanic Eruptions

The tropical cyclones known as typhoons that visit the Philippines yearly - about 19 typhoons per year - wreak great havoc and destruction that cost the country millions of pesos. Crops, houses, buildings, bridges, and even lives are destroyed. The destruction is caused by the strong winds. Heavy rains causing large amounts of water to drop within a short period of time flood the valleys and the plains. During typhoon seasons Manila is usually flooded bringing about the disruption of the normal flow of traffic, necessitating the suspension of schools and sometimes offices. Industrial production is affected.

Aside from warning signals and activation of disaster brigades who help minimize the sufferings of the

victims there is little that could be done in terms of elimination or even prevention of the typhoon phenomenon.

Volcanic eruptions and earthquakes occur less frequently than tropical cyclones. The most active volcano in the Philippines - Mt Mayon - erupted in 1984 and temporarily displaced about 11,000 families from their homes for a few months. Crops, homes, domesticated animals were destroyed and even lives were lost. The destruction was estimated at P102.4 million.

About 60 minor earthquakes were recorded in 1984 but no major damage nor loss of lives were reported. In 1983 however 19 persons died and P14.8 million worth of infrastructure damage were reported.

A National Disaster Coordinating Council was established to coordinate and facilitate services from various agencies to aid victims of natural calamities.

III. CURRENT FORMAL AND NONFORMAL ENVIRONMENTAL EDUCATION PROGRAMS, THEIR OBJECTIVES, APPROACHES TO IMPLEMENTATION, RESULTS OBTAINED AND PROBLEMS ENCOUNTERED

To date no overall plan for formal or nonformal environmental education has been formulated or prescribed by education authorities. But the National Environmental Protection Council has started a project to develop a Master Plan for Environmental Education for the formal education

system sometime in July this year. Hopefully this Master Plan shall be completed by early next year.

A. The Formal Education System

An examination of the curriculum requirements for both elementary and secondary levels, particularly those in Science, will reveal that some enviromental conservation concepts are integrated into all grad levels.

A content analysis of existing instructional materials (consisting of textbooks and pamphlets or modules as enrichment) for the elementary and secondary schools to determine their environmental content was undertaken by a group of researchers at the University of the Philippines, Institute for Science and Mathematics Education Development (UP-ISMED). The study showed that more elementary school materials include the "for" the environment theme while the secondary school materials have more of the "about" the environment theme. The "for" the environment theme focuses on the values and attitudes toward the environment while the "about" the environment theme deals with the developmewnt of knowledge and understanding. The study also showed that Philippine events and locations were more frequently used in the development of environmental topics, rather than foreign events and locations. It was also shown in the same study that the Grade IV books and modules contain the most number of environmental enhancement concepts, and the Grade VI books and modules contain the least. In the secondary school

materials, it is the First Year books which contain the highest number of environmental enhancement concepts while the Fourth Year books and modules contain the least.

A perusal of the curriculum guides shows that the Grade III Science and Health curriculum prescribes the teaching of healthful and healthy surroundings, ways of keeping one's surroundings clean and safe, ways of using and handling such substances as kerosene, insecticides, and herbicides, noise pollution, and ways of minimizing noise pollution.

The Grade IV Science and Health curriculum requires the teaching of ways of eliminating insect pests, causes and affects of soil erosion, soil pollution, the effects of polluted soil on plants, and ways of conserving soil.

The Grade V Science and Health curriculum requires the teaching of care and appreciation of wildlife, air and water pollution, the effects of air and water pollution on human health, and water conservation.

The Grade VI Science and Health curriculum requires the teaching of population and resources, particularly food and water supply, the incidence of malnutrition and communicable and chronic diseases in a rapidly increasing population, the importance of forests and wildlife, forest and wildlife conservation, typhoons and floods, earthquakes, and disaster preparedness.

Similar topics are dealt with in the secondary level but taken at a higher level. The secondary school teacher, in general, has a better grasp of environmental conservation concepts than the elementary school teacher by virtue of his/her pre-service training.

The strategy in teaching environmental concepts in science courses is to demonstrate/illustrate/exemplify the importance and relevance of science to the environment and its conservation.

An Environmental Education course is taught separately from science but only as an elective in the second year of the secondary school.

Several universities in the country are now offering degree programs in environmental studies. The University of the Philippines at Los Banos has recently opened an MS in Environmental.

B. The Nonformal Education System

In the Philippines nonformal environmental education is pursued more assiduously by the non-government organization such as the Haribon Society, the Philippines. Federation for Environmental Concern, Lingkod Tao-Kalikasan (Service to Man and Nature). Each

of these organizations produce newsletters, brochures, brief reports on environmental events, issues or concerns, and surveys and investigations of environmental conditions which are sent out to subscribing members. Every so often one or more of the NGO's sponsor seminar workshops or conferences on a particular topic or theme, or pays for air time to broadcast or televise certain environmental concerns.

The result? - More and more people are becoming informed and concerned about their environment. It is these well-informed and very concerned people who have taken the initiative to rally against certain government projects that are likely to destroy and degrade the environment. It terms of percentage of the total population, however, they comprise a tiny portion.

Still the problems are manifold. A large percentage of the citizenry remains uniformed, ill-informed, or misinformed about their environemnt. In the opinion of this writer, the answer lies in a massive educational blitz in the formal as well as the nonformal grounds to include top government officials and lawmakers all the way down to youngest citizen who can sit up and watch and/or listen.

IV. PRE-SERVCE, PRIMARY AND SECONDARY, TEACHER TRAINING

A. Institutional Infrastructure and Academic Levels

Pre-service training of teachers, whether for the elementary or secondary level teaching, begins normally at the 11th year of schooling after having gone through six years of primary school and four years of secondary school.

The pre-service training course can be a two-year certificate program or a four-year diploma program. The four-year diploma program leading to BEE (Bachelor in Elementary Education) prepares the student for teaching in the elementary school while that which leads to a BSE (Bachelor of Science in Education) prepares a student for secondary school teaching.

The BEE does not specialize in any particular subject he/she will teach in the elementary school. In practice, one elementary school teacher stays with one class and teaches all subjects from reading, to arithmetic, to language, to social studies, to science, etc. The environmental dimension of the BEE's pre-service training is found mainly in the science courses. In a workshop in 1986 led by the Bureau of Higher Education on the proposed curriculum for teacher education, it was recommended that the BEE trainee takes 12 credits of science broken down into physical science,

biological science, earth science, and one titled Science, Technology and Society. According to the brief description of the course Science, Technology and Society the student focuses on "an analysis from the historical, current, student focuses on "an analysis from historical, current, and future perspectives of the nature and role of science and technology in society, and of the socio-cultural and the politico-economic factors affecting the development of science and technology in the Philippine setting.

The workshop recommendation further encourages the BEE graduate to specialize in teaching science in the elementary level by acquiring a Certificate Program in Science. This would mean 18 more credits in the sciences (Physics, Chemistry, Biology and Environmental Science and Health). The Environmental Science and Health course emphasizes the development of concern for the problems of an increasingly complex society (i.e. pollution, food sanitation, radiation exposure) and measures for prevention and control.

The same workshop recommends that the BEE major in science takes 55 credits of science with each course giving attention to the environmental dimension. The proposal is being subjected to close scrutiny but is likely to be approved soon with some modifications for implementation in 1988.

Each course instructor takes care of the evaluation of learning acquired by the trainees. The instructor is left to dig up Philippine condition, events, standards, etc. to inject the local content of the courses. UP-ISMED, however, has started to make plans for the development of textbooks for use in the Pre-service training of teachers. The main thrusts of these materials will be the Philippns-based content (i.e. making use of studies conducted by Filipino scientists on Filipino subjects in a Philippine setting).

It will be noted from the above discussion that the Pre-service education, and indeed the entire tertiary education, continues to suffer from a dearth of locally-based instructional materials both in the sciences and environmental studies.

The future looks bright, however, as the Bureau of Higher Education strives to improve curricula, facilities, and academic qualifications of teacher educators. The Department of Science of Technology, the highest national body that looks after the manpower development in science and technology as well as in science education is taking a strong stand in encouraging development of textbooks and reference materials by Filipino authors by accepting project proposals of this nature. In the Philippine

educational context, environmental studies or environmental education as a course in the primary, secondary, and tertiary levels lies within the domain of the science.

V. In-Service Primary and Secondary Teacher Training

Large scale in-service training programs had been undertaken by the Bureau of Elementary Education in national training centers (the UP-ISMED is the national training center for science and mathematics), in the thirteen regional training centers all over the country, and the divisional and school training programs in cascading order since 1981 to 1987 for the elementary school teachers in the public schools.

These training programs were nationally funded. The elementary teachers selected for training were released from their teaching assigments for four weeks, were provided stipends and tuition, and were sent to national training centers where they undertook intensive training in certain subjects. The subjects given the most attention in these training programs were science and mathematics because it was felt that teachers most needed training in these areas. This was indicated in the low achievement scores of the elementary students in science and mathematics. Even as it is dubbed large scale, the in-service training program for elementary teachers could allow the training of only 50-60

teacher trainees per subject per year. That meant a total of 300 teachers per subject trained over the six year period. These teachers were expected to echo the training in their particular regions and their trainees to further echo them in the divisions and schools. There were many cases, however, where planned echo trainings were not held due to a number of constraints. These are :

(1) difficulties in having teacher trainees released from their teaching assignment

(2) difficulties in obtaining funding for travel and stipend during attendance of training which is held in a locale different from the place of work of the trainee

(3) lack of training materials

(4) lack of facilities and equipment for training.

The secondary level in-service training in all subjects areas is scheduled to begin in early 1988. The same cascade training arrangement will be followed but a slightly longer time will be allowed.

In both primary and secondary level in-service training programs environmental education finds a most comfortable niche in the science subject. There is, however, a most visible effort to integrate the environmental dimension in

all other areas by a few avantgarde master teachers of language, reading, home economics, and even PE and health.

No follow up program was instituted with the large scale in-service training. Evaluation of the effects of the training of teachers on student learning will surface only in the national examinations which are administered normally upon completion of the sixth year in the elementary and after the fourth year in the secondary schools. It is evident from the questions now included in the national examinations that the learning of environmental concepts are beginning to play a more important role.

The private schools have also taken to in-service training programs. During the intersemestral vacation and the long summer vacation, groups of private schools like those organized under the Catholic Education Association of the Philippines (CEAP) arrange training programs for their own teachers. However environmental education has as yet little foothold in these programs. But these private school organizations will be rich grounds for installing and nurturing an environmental education program.

The UP-ISMED regularly offers two to four short-term courses on strategies of teaching environmental education and the content of environmental education. The instructors of these courses noted the high interest in environmental learnings generated in teachers. At the beginning of such

courses teachers are asked to respond to a questionnaire in which they indicate the number of years of experience in integrating environmental concepts in their teaching and if they had not had such experience yet, to explain why. Those who rarely or never integrated the environmental dimension claimed that they felt inadequate to teach it since they had little or no background on the subject but would very much like to learn through the short-term course. These responses of the trainees resulted in the offering of these courses on a regular basis with some changes in the topics focused.

With the projected expansion of the facilities of UP-ISMED in 1989, the Institute will be able to offer more environmental courses to teachers as well as interested shcool supervisors and teacher educators.

VI. SUGGESTED PRIORITIES FOR PRE-SERVICE AND IN-SERVICE TRAINING OF PRIMARY AND SECONDARY SCHOOL TEACHERS IN ENVIRONMENTAL EDUCATION.

The priorities for improved pre-service and in-service training in the immediate future are as follows:

1. the formulation of a master plan for environmental education. The master plan would identify the levels and the areas of greatest need for development of programs and training;

2. the development of programs for each grade and year level identifying the points of entry in the curriculum of each subject for the integration of environmental concepts;

3. the development and eventual large scale production of books, reference materials, training manuals, and elementary school readers and secondary schools resource materials and to make them available to teachers and students at minimal cost;

4. the linkage with industry and government infrastructures for on-site observation of environmental effects and the measures taken toward prevention and/or reduction of destruction, as well as the measures toward enhancement of the environment;

5. the increase in the number of in-service training programs for teachers on the integration of environmental education in the regularly prescribed curriculum;

6. a networking of various grouups interested in developing environmental awareness, knowledge, values and attitudes. Teachers should be drawn into professional organizations of this kind to enhance their own awareness, knowledge, values, and attitudes as well. The more knowledge they

acquire, the more confidence in teaching they develop.

ENVIRONMENTAL EDUCATION IN SRI LANKA

By

N.S.R. De Silva*

1.0 INTRODUCTION

The tropical island of Sri Lanka, "the Pearl of the Indian Ocean" has a land area of 65610 square kilometers measuring a maximum length of 435 kilometers from North to South and 225 kilometers from East to West, at the Widest point. According to the 1984 statistics, Sri Lanka has a population of 15.4 millions. A variety of climatic regimes determined by the geographical position of the Island and its topography, prevail within the country. The variety of natural resources available within the country and the surrounding territorial waters have the potential to provide every inhabitant with the necessities of life, if properly exploited, without hurting the environment. Un-inhibited exploitation of natural resources with indiscriminate use of modern technology bring about advese effects on the environment creating imbalances in nature. Environmental Education can play a very meaningful role in developing a compassion for the quality of the environment and

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in equipping individuals with competencies for the judicious us use of the resources in the environment. Thus the Environmental Education is considered a high priority area of national activity.

The importance of the protection and improvement of the environment has gained constitutional recognition in Sri Lanka in Chapter VI of the Constitution of Democratic Socialist Republic of Sri Lanka, which deals wish "The Directive Principles of State Policy and Fundamental Duties", Article 27(14), declares "The State shall protect, preserve and improve the environment for the benefit of the community". In the same chapter, Article 28(f) lays down a fundamental duty to all citizens to proetect nature and conserve its riches". This has made it obligatory on the part of country's education system to respond adequately to the above constitutional demands.

2.0 MAJOR ENVIRONMENTAL PROBLEMS OF THE COUNTRY : THEIR MAIN CAUSES AND MEASURES TAKEN FOR THEIR SOLUTION AND PREVENTION

Environmental problems in Sri Lanka may be attributed to two main causes.

(a) The rapid rate of population growth along with its pressure on natural resources.

(b) The accelerated development programmes which help to alleviate poverty and improve the economy and standards of living of the people.

Some of the major environmental problems encountered in the country are:

2.1 Depletion of Natural Forest Cover

An aerial survey carried out in 1956 indicated an estimated forest cover of 2.9 million hectares, occupying 44% of the total land area. But in 1982 the estimated forest cover was only 1.62 million hectares, which is about 25% of the total land area. Opening of forest cover for agriculture, human settlements, timber and fuel wood requirements have contributed towards deforestation. With deforestation, the extinction of species of flora and fauna, becomes another environmental problem. In an attempt to arrest the rate of deforestation the Forest Department, which is the main institution which manages the forest lands, is activily engaged in reforestation programmes, and to date they have raised about 160,000 hectares of man made forests in different parts of the country. Along with it, the tree planting compaign launced by the governmewnt, where the citizens too participates, a headway is being made towards increasing forest cover.

In order to protect wild life habitat in Sri Lanka, there are 54 protected areas as national parks, Sanctuaries, strict natural reserves, and nature reserves covering an area of 6,405 square kilometer (9.3% of total land area). Large number of birds, reptiles and other animals and several species of plants are also protected by legislation under the fauna and flora act.

The responsibility of development and management of land resources of Sri Lanka is diffused among several ministries, departments and organisation. Each agency formulates and implements its own development programmes according to priorities. It is felt that greater co-ordination among the various programmes should be achieved. For example need for a National land use policy is keenly felt.

2.2 Depletion of Mangrove Community

A recent survey carried out by the survey department indicates that the extent of mangrove forests have greatly declined. This is mainly due to felling for fuel wood, reclamation for construction of tourist hotels and houses and also to develop prawn farming ponds. The conservation of the mangrove forest becomes important as they play an important part in coastal fishery, as land builders, as storm barriers and spawning, nursery and

feeding ground or as shelter areas of commercially important fish and shell-fish. The importance of the mangrove community as a resource for biological research, in areas such as salt resistance in plants, is being increasingly appreciated by biologists.

2.3 Coastal Erosion

Though the coastal line of the country is about 1600 kilometers in length, nearly one third of it is subjected to varying degrees of erosion. Major factors that contribute toward coastal erosion in Sri Lanka are indentified as unplanned development activities along the coastal belt - coral mining, sand mining and destruction of coastal vegetation. Fifty percent of Sri Lankans annual requirement of lime is obtained from coral. Recent estimates have shown that 2282 tons of coral was removed from reef and 5377 tons of coral debris are collected from the beach.

The protection measures to arrest coastal erosion have cost the Sri Lankan government a sum of Rupees 60 million during the last decade. In 1978 the Coastal Conservation Department was set up with a mandate to carry out coastal engineering research, coastal zone management and implementation of schemes of work for coastal protection.

2.4 Pollution of Water, Air and Land

Sources of water pollution are many and varied, major one being industrial, domestic and agriculture. Overuse of fertiliser and pesticides and mismanagement of water have resulted in polluted/salinated soils in some agricultural schemes. Air pollution has resulted from combustion of oil fuels, industrial establishments producing carbon dioxide, unburnt hydro carbons, oxides of nitrogen, sulphur dioxide and particulates.

For environmental protection purposes; The Central Environmental Authority was established in 1980, under the National Environmental Act 1980, as a coordinating and policy making body. It also provides for monitoring and control of pollution of air, land water including ground water and choice levels.

The Sri Lanka Standards Institute has been involved in preparation of National Standards for industrial effulents for areas of environmental concern. In 1983 the Central Environmental Authority has issued a set of interim standards, until Sri Lankan Standards institute lays down the Standards.

Significant environmental problems have arisen as a result of locating industries side by side with residential areas, or in environmentally critical areas. More recently the Urban Development Authority has defined

primarily residential, Commercial and industrial areas for certain parts of the country in an attempt to provide environmentally clean areas for inhabitant.

2.5 Accumulation of Garbage And Non-Biodegradable Material

Especially in urban areas disposal of garbage indiscriminately also leads to pollution and provides breeding ground for disease spreading insects like house-flies and mosquitoes. Accumulation of non biodegradable materials like polythene, plastic, rubber, bottles etc, aggravate the environmental problems.

To arrest these situations agencies like local bodies, municipality, health department etc. have launced "keep city-clean" programme throughtout the urban areas, so that the people are made to be aware of the responsibilities of keeping the environmental clean.

3.0 CURRENT FORMAL AND NON-FORMAL ENVIRONMENTAL EDUCATION PROGRAMMES, OBJECTIVES, APPROACHES TO IMPLEMENTATION, RESULTS OBTAINED AND PROBLEMS ENCOUNTERED

3.1 Current Formal Environmental Education

In Sri Lanka the environmental education is not taught as a separate discipline at any level in formal school education. At all levels of school education environmental education forms an

important component in the prescribed curriculum in the context of several school subjects.

At the primary level of schooling on integrated curriculum refered to as "Environmental studies" embodies an environmental education component. The content of this curriculum is organised under 11 study areas (vide 4.0)

The Environmental Studies curriculum has been designed to provide learning experiences through activity based environment oriented methods. This offers the child opportunaties for active participation in the teaching/learning process. The curriculum is multi-disciplinary, and the themes are gradually developed in a spiral sewuence, with progressively increasing depth, as the child progresses through the school years 1 to 5. In doing so the child aquires some knowledge and understands the elements of physical, chemical, biological, social and cultural aspects of his environment.

From school year 4 onwards the child gains further experiences with respect to environmental education through the subject "Introductory

Science", which also has an environmental component.

During the secondary level of schooling i.e. from school years 6 to 11, all students follow a common curriculum consisting of 9 separate subjects. Here too environmental education is not treated as a separate discipline, but has been incorporated into the subjects Science, Social Studies, Health Education and Physical Education (vide 4.0). Here the curriculum provides environment based experiences in seperate disciplines to provide the students a rational basis for understanding the nature and the quality of the environment and for appreciating the need for conservation.

At the Collegiate level which is the final phase of schooling, the environmental component is incorporated in the disciplines. Botany, Zoology and Chemistry in the Science stream and in Geography in the Arts stream (vide 5.0).

3.2 Implementation

In implementation at the primary level, the emphasis is first hand experiences with the

immediate environment of the child. While this trend continues beyond the primary level with increasing sophistication, the scope of the curriculum extends to the wider environment from village or city to the district, the whole country and to the rest of the world. At the higher levels concepts are developed both through personal investigations and second-hand data gained from printed materials, radio, television programmes etc. The analysis of relevant real-life situations and related environment issues during learning, is encouraged. This aspect of learning is considered at in-service teacher education work-shops and is given due recognition during assessment of student performance.

3.3 Results Obtained

The emphasis an environmental education has over the years increased. This is indicated by evaluation standards set by the two National examinations namely GCE (OL) and GCE (AL), with regards to the environemntal component in the various subjects. There has been a general increase in the number of questions included in the questions papers over the last few years. An analysis of the types of questions and the duration

related to the environmental component in GCE (AL) Botany question papers in 1978 and 1987 is given in Table 1 below.

Year	Question Type*			Answering time in minutes**
	Multiple choice fixed response type	Structured free response type	Semi structured and free essay type	
1978	7/75	1/4	0/6	29/300
1987	10/60	1/4	2/6	90/300

* In each of the cages the numerator indicates the number of questions or part of questions based on environmental concepts and the denominator indicates the total number of questions of each type appearing in the question paper.

** In the last cage the numerator indicates the time duration for answering the questions based on environmental concepts and the denominator indicates the total time allocated for the entire question papers.

3.4 Problems Encountered

As a developing country, the literacy rate of Sri lanka reaching approximately 85%, can be considered very high. To cater to the student population of nearly 3.5 million is about 9700 government schools, there is a teacher population

of nearly 135,000. Although this works out to a gross average teacher-pupil ratio of about 1:27 the actual ratio in the classroom may be much less. The problem of large numbers of pupil in classes affect teaching-learning process adversely. Shortages in resources in schools swuch as equipment and apparatus pose further problems. Teachers in the urban schools are handicapped with lack of suitable natural environments in the immediate surroundings for activity based teaching and learning experiences. The problems arising from the dearth of adequately qualified and professionally trained teachers in environment education, especially at the primary school level, is being rapidly remedied by the various teacher training programmes, including inservice education.

3.5 Current Non-formal Environmental Education Programmes

Some of the more important programmes in operation which have on the school environmental education are listed below.

(a) The Field Studies Centres Programmes

The programmes highlights the using of natural habitats as a teaching and learning

resource in environmental studies. There are seven such centres located in different parts of the country. Each centre has been developed within easy access to an extensive and ecologically complex natural habital such as a lagoon, forest reserve, riverbank, large tank etc. Centres also have laboratory facilities and residnetial facilites enabling students and teachers to conduct studies using the natural environment as a resource.

(b) Science Education Support Centres Programme

There are three such centres in Sri Lanka, the main objectives of the centres are :

- to help the teachers to plan stimulating lessons.
- to enable teachers to make simple apparatus by improvisation and use them in schools.
- to use environment as a teaching resource.
- to improve the knowledge of teachers.

These centres organise and conduct seminars and workshops for teachers, and each centre is capable of

providing residential facilities for about 30 teachers.

(c) The Committee for the Popularization of Science of the Sri Lanka Association for the Advancement of Science

Programmes conducted by this committee such as the "Nature Diaries Programme" and "Use of Hazards of Agrochemical programmes", have been helpful in environmental studies. However such programmes are few and participation limited to selected schools.

(d) Out of School Science Activities

The activities were organised by teachers and students of selected schools under the guidence of the Curriculum Development Centre. Some activities were environmentally oriented and they are listed below:

1. Landscaping the school garden.
2. Preparation of a botinical garden to help in studying the environment.
3. Effect of the environment on school.
4. Analysis of soil samples and recommending suitable type of manure.

5. A study of the factors responsible for pollution

6. The study the differences in soil erosion with respect to the inclination, rainfall, and surface coverage, and to observe the texture of the normal and eroded soil.

7. Investigation of reasons for the mosquito menace in Negambo urban area and suggest action to eradicate the propagation of mosquitoes.

8. A study of the animal distribution and their inter-relationship with the environment in a selected area.

9. A study of Graminge family of plants growing in the Richmond College garden.

Some of these activities were presented in a workshop sponsored by UNESCO. The Curriculum Development Centre hopes to extend this type of activities which promote envronmental education, to other schools as well.

(e) Non-formal Environment Education Through Public Media

The television and the radio have been extensively used

in this type of environmental programmes. Some of the programmes were written and conducted by teachers and teacher educators. Some programme were in the form of discussion by resource personnel. The news papers and the periodicals have often been another valuable source of non-formal environmental eduction.

(f) Non-Formal Environmental Education Programmes Conducted by the Central Environmental Authority

The Central Enviromental Authority has been instrumental in carrying out a number of non-formal enviromental education programmes.

(i) They have organised non-governmental enviromental organisations at three levels, National level, Local level and school level. The members of these organisation receive a training on various aspects of the environment.

(ii) They broadcast a radio programme on environment once a week.

(iii) They put out a news letter once every two months.

(iv) Pioneer Brigades - School Children organised in groups for the purpose of envolving them in environment related activities. As an initial step 50 schools from different parts of the island have been selected.

(v) They have published two supplementary readers for children between the ages of 11-14. The books written in story from stress the value of forest cover.

(vi) Annually a wide range contests are held in concepts of environment. The contests take the form of essey, photograph, poster and video film competitions.

4.0 PRE SERVICE PRIMARY AND SECONDARY TEACHER TRAINING

4.1 The School System

The formal school education in Sri Lanka spans over 13 years, with the minimum age for entering school at 5 years. The school system consists of four distinct levels.

(a) Primary level - school year 1 to to 5 (Age 6 to 11)

(b) Junior secondary level - school year 6 to 8 (Age 12 to 13)

(c) Senior secondary level - school year 9 to 11 (Age 14 to 16)

(d) Collegiate level - school year 12 to 13 (Age 11 to 18)

(a), (b) and (c) constitute the open access phase of education. At the end of year 11 the students sit a

common examination namely, the General Certificate of Education (Ordinary Level) (GCE-OL), conducted by the Department of Examinations of the Ministry of Education, Sri Lanka. Only students who reach a specified minimum level of performance at the GCE (OL) may proceed to Collegiate level - The minimum requirement being passes in 6 subjects at GCE (OL), including passes in Mother Tongue, Mathemtics and Credit passes in three subjects. There is a further specification of subjects, for which the previously mentioned credit passes should be obtained for the purpose of gaining entry in to the separate subjects streams at the Collegiate level.

At the Collegiate level there are three main alternative subject streams namely Science stream, Arts stream and Commerce stream. The students who proceed to the collegiate level have to sit for another common examination conducted by the Department of Examinations at the end of school year 13. This examination is known as the General Certificate of Education (Advanced Level) [GCE (AL)]. While being the highest examination in general education, the GCE (AL) also serves as the basis for selection of students to the various faculties of the national universities.

4.2 Teacher Training Programmes

The school teachers may be divided into three

main categories depending on the above mentioned levels of schooling.

(a) Primary education

(b) Secondary education

(c) Collegiate education

The organization of pre-service and in-service teacher training is based on two major criteria.

(a) School level at which the teacher teaches

(b) The subject are or areas taught by the teacher.

4.2 Pre-service Training Schemes

At the moment two schemes are in operation in Sri Lanka for pre-service training of teachers.

4.3.0 Colleges of Education

Colleges of Education under the Ministry of Education were first established in October 1985. There are seven such colleges established in different educational regions of Sri Lanka. By 1990 the number is expected to be increased to nine. At present there are about 2000 students undergoing training and this number

will be gradually increased to about 5000 by 1990.

4.3.1 Course Available

1. Primary education
2. Mathematics
3. Science
4. English
5. Social science
6. Physical training
7. Home economics
8. Religion

4.3.2 Entry Requirement

1. Three passes at GCE (AL) Examination at one and the some sitting having a minimum aggregate of one hundred and eighty marks.
2. Between age of 18-22.
3. Unmarried.

The candidate having the above requirements face an interview before selection.

4.3.3 Course duration

Three years - two years of which are institutional and residential followed by one

year of intership.

4.3.4 Objectives of Colleges of Education

1. The main objective of College of Education should be to produce teachers endowed with these qualifications as reflected ;in the objective of teacher education. It is specially important that these teachers possess these knowledge, skills and attitudes that are functionally essential to teach specified area of the school curriculum and to carry out various other dutiesa as teachers in the particular context of the Sri Lanka school system. In addition to these colleges are also expected.

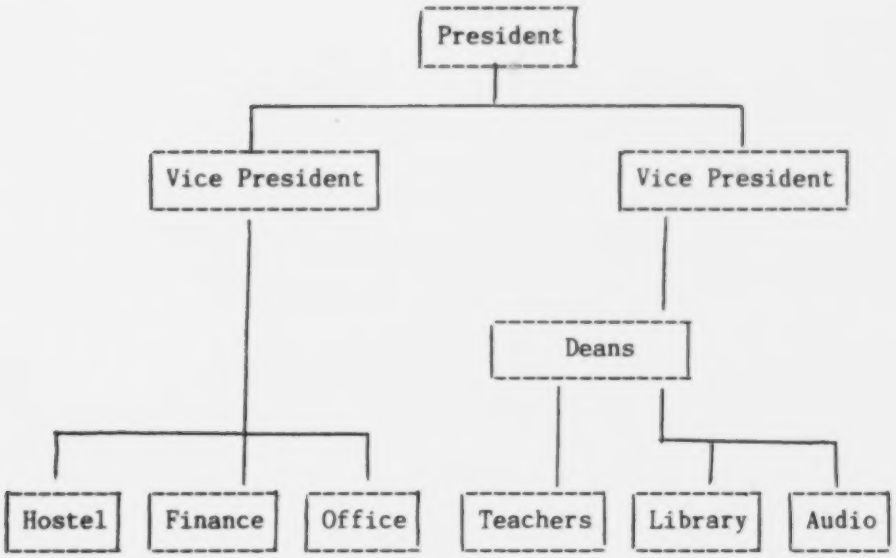
2. Promote the professional growth of their own staff by mutual exchange of their expertise and other resources thereby raising the professional status of both the institution and its staff.

3. Improve the educational standard of the schools around the Colleges of Education by enriching the curricula, teaching devices and other activities and by serving in an advisory capacity in these schools.

4. Contribute towards the better understanding of problems and issues affecting education in Sri

problems and issues affecting education in Sri Lanka by carrying out appropriate studies.

4.3.5 Administrative Structgure



4.3.6 Teaching Staff

The academic staff is normally residential and most of them have post graduate qualifications.

4.3.7 Curriculum Specifications

The curriculum of the Colleges of Education is not to be conceived as the aggregate of the numerous courses provided but as the sum total of all the experiences and activities to which those Colleges expose thier students. From this point of view the

expose thier students. From this point of view the following specifications for the new curriculum have been derived from the objectives of teacher education and categorized under four broad areas as follows:

1. Foundation Courses in Education

This area including courses such as phychological, philosophical and sociological foundations of education, educational evaluation and guidance school and the community etc. is to provide the professional core which teachers need as functioning members of a profession. Traditionally this an area dominated by theory courses. But in the new curriculum, a concerted effort should be made to relate theory to practice.

2. Courses in General Education

General Education is often defined as those phases of learning which should be the common experiences of all men and women. In teacher education it derives its relevance from the fact that a teacher has to be educated as a person in addition to being educated as a professional. The emphasis here is on those areas of learning that are functionally essential for a

teacher but not provided either under Foundation Courses in Education or under the area of specialisation. The courses include Mother tongue, English Religion and Culture, Health and Physical Education Aesthetic Education and life skills.

3. Area of Specialication

This area emphasizes the mastery of the knowledge and concepts that make up the subject matter content of that aspect of the instructional programme specially chosen by the prospective teachers. An equal or greater emphasis is to be given to the teaching methodology applicable in transmitting these knowledge and concepts to the pupils.

4. Unscheduled Activities

These are labelled 'Unscheduled Activities' mainly because of the unpredictability of the duration of time required for them. These activities include Self learning, Scouting and guiding, Societies and clubs, Cultural activities, hobbies etc.

4.3.8 Techniques of Instruction

For the purpose of organising instruction students are grouped - about 15-20 comprising each group. Very little formal lectures are given. Most of the learning activities are in the form of projects. Students are expected to do a certain number of projects during the course. For example in Science through these projects it is ensured that the students acquire the relevant knowledge, skills and attitudes required of a science teacher.

4.3.4 Some example of projects:

(i)	Use of agro-chemicals in agriculture.	For Science
(ii)	Chemical used in the kitchen.	
(iii)	Ecological changes in a lake during fish breeding.	
(iv)	Difficulties in teaching electrochemical series in grade 10	For Teaching Science
(v)	View on teaching of grade 6 Science syllabus.	

In addition to these project there is a series of discussions held on different topics.

A novel feature in the courses is what is given as "Educational practices". This new concept needs elucidation. The general tendency in delivering most of the materials in the foundation courses is in the form of abstract theories, and the student is expected to apply these theories, and the student is expected to apply these theories in concrete educational situations. But leap from abstract theory to concrete application becomes more difficult when the time lapse between the acquisition of theoritical knowledge and its application in concrete situations is wider. Therefore the need for opportunity for regular and continuous practice has to be recognized. "Educational Practices" is an attempt to meet this need.

The students are instructed to visit a school one day a week and carry out project such as value study of child behavior, social environment of children etc. Students also get first hand information about school administration, management of school laboratories etc. The students are expected to engage in classroom teaching to acquire skills of classroom management. They also get first hand information regarding pupil behaviour problems and learning difficulties. They are encouraged to use audio-visual aids. Different teaching techniques are

highlighted using micro-teaching techniques, simulation etc.

4.3.9 Co-curricular Activities

One of the most important aspects in these training institutions is that the co-curricular activities are given an equal place as academic activities. Normally student takes part in all co-curricular activities during the second year and activities of his/her choice during the second year. These activities are held every working day from 4.00 to 6.00 p.m. These include Scouting, Guiding, Cadetting, First-Aid, Music, Dancing, and Social activities. Other than these, special activities are organised to foster leadership qualities and social skills.

4.4.0 Pre service Training Scheme for Fresh University Graduates and Uncertified Teachers

Certain catagories of pedagogically unqualified persons such as fresh university graduates and some times due to special circumstances GCE (AL) qualified persons, are directly recruted as teachers, after a test or an interview or both. From 1983 December onwards such recruits have been give a short orientation course of three weeks before being

sent to schools. This training conducted in several centres concurrently is institutional and residential. During these pre-service training sessions the recruits are briefed on

(a) rules and regulations pertaining to the services of teacher.

(b) Administrative structure of the Ministry of Education.

They also received instruction in relevant subject areas such as Educational psychology, Aesthetic education, Health etc. Physical training and organisation of co-curricular activities, specially in field of sports, is emphasised in this course.

4.5.0 Teacher Training Objectives related to Environmental Education

The following appear to be the board objectives of the environmental education component in the school curriculum.

(i) Develop an appreciation of the environment

(ii) Gain on understanding of various components of environment in its dynamic nature

(iii) To become concerned about maintaining a clean and healthy environment.

(iv) Actively support national programmes and activities aimed at environmental conservation.

(v) Possess some basic competence required by individuals to prevent further deterioration, or actually improve the quality of the immediate environment.

(vi) To develop the ability to handle simple apparatus and carryout simple experiments with environment components.

(vii) To develop human fellow-felling.

(viii) To develop correct attitudes and values.

The development of teacher competencies required to achieve the above mentioned objectives in the context of Sri Lankan schools form a vital part of the teacher training objectives.

Regarding the training of secondary level teachers, it is difficult toi extricate pure environmental education objectives from those related to the separate disciplines and methodologies due to the multi-disciplinary approach to environmental education at this level.

In respect of the primary level teacher, teacher training objectives include the development of their ability to successfully implements the integrated "Environmental Studies" curriculum which is operative in the primary school. More specifically they may be stated as follows:

The student teachers following this course should achieve broad objectives listed below:

1. He should acquire an understanding and a knowledge of the (i) Environment (ii) Changes taking place over the years.

2. Develop the skill needed to carry out the Environmental Studies programme successfully in the Primary school.

3. Develop scientific attitudes, on inquiring mind and an appreciation of the environment.

It is intended that at the end of the course the student teacher :

1. Identifies and understands the contents of the physical and social environment.

2. Acquires a knowledge for a healthy life and understands the need for developing good health habits in children.

3. Identifies and understands the interaction and changes in the environment.

4. Appreciates the cultural heritage of the country.

5. Recognises the need and importance of developing national amity.

6. Practices the techniques of studying the environment.

7. Appreciates national customs and good living habits.

8. Acquires a knowledge about the historical legends and events related to great kings of Sri Lanka.

9. Acquires a knowledge about the historical legends and events related to great kings of Sri Lanka.

10. Acquires a knowledge of the History of Sri Lanka.

11. Understands and practices the scientific method.

12. Develops the necessary skills and techniques required for a successful environmental studies programme.

4.6.0 The Environmental Dimension of Teacher Training Curriculum

In the Colleges of Education there are common

compulsory components in the primary as well as secondary teacher training curricula which includes the following environmental education components.

4.6.1 (i) School and the Community Programme

This is designed to develop:-

(a) an understanding of the environment, especially in relation to environmental problems like health, water pollution, food, diseases etc, and possible solutions.

(b) flexibility in adjusting to the local environment and the problems there of.

(c) the ability to make use of the resources available in the envvironment especially for the purposes of class room teaching.

(ii) Physiological Foundations of Education

This also includes an environmental component such as :

Heridity and environment, where the teacher is encouraged togather information regarding the social as

well as the physical environment of his/her students.

(iii) **Health and Physical Education**

This too includes environmentalk components.

4.6.2 **Primary Level of Education**

These components form a common introductory core for environmental education. For trainees who undergo specilisation in Primary Education there is a curriculum with five areas.

(a) Language (Mother Tongue)

(b) Mathematics

(c) Environment

(d) Creativity

(e) Aesthetics

The time allocated for this entire course is 360 hours. One fifth of this time, i.e. 72 hours, is set apart for environmental education, where they will develop, the knowledge, skills and attitudes sufficient to teach "Environmental Studies" at Primary level of education, in which the content of the curriculum is organised under eleven study areas or themes as follows:

(a) Our home and their inhabitants

(b) What we eat and drink

(c) Help for our work

(d) What we wear

(e) unity in diversity

(f) Things around us

(g) Our school and its neighbourhood

(h) People who help us

(i) How we travel and communicate

(j) Our Earth and surroundings

(k) Things we see and hear

4.6.3 Secondary Levels of Education

At the secondary level of education the environmental education components are mainly inco-operated into the disciplines Science, Health Education and Social Science. Accordingly in the Colleges of Education, for the trainees who specialise to teach these subjects in secondary level of schools have the environmental education component in-co-operated in the Science, Health Education and Social Sciences courses. Thus these curriculum content in environmental education in the respective subjects include the following areas which are in accordance with the curriculum of the Secondary school. The environmental components for the

respective subject and school year are listed below.

YEAR 6.7.8 - SCIENCE

YEAR 6

6.1.0 Exploring the surrounding environment.

6.1.1. Investigation of the environment around home and school. Identifying various components (such as water, rocks, air, animals and plants).

6.1.3 Environment as a resource.
Importance of water, rocks and clay to man.

6.8.0 The sky we see

Things observed during the day and night, in the sky. (e.g. clouds, moon, sun).

YEAR 7

7.3.0 Living organisms and water

7.3.1 Importance of water to man

7.4.0 Living organisms and air

7.4.1 Composition of air

7.5.0 Nature of the Soil

7.5.2 Soil and plant growth

7.5.3 Soil and Industry

A brief introduction on how soil is being used by man for agricultural purposes. A simple study of the materials obtained from earch in the manufacture of tiles, bricks, glass and cement.

7.5.4 Soil erosion and conservation.

Erosion of soil due to rain and wind.

Erosion of soil due to activities of man

Importance of soil conservation.

7.9.0 Sun, Moon and Earth, and their movements.

YEAR 8

8.10 Man and Environment

8.11 Inter-relationships between man and natural environment.

How man makes use of land, water, air and living organisms, for his needs.

8.12 How changes in the environment caused by man, boomerang on him.

Inquiry into the pollution of atmosphere and water.

8.20 Changes in the atmosphere and weather.

Atmospheric temperature, Atmospheric pressure, humidity, dew, rain, depression, and cyclones.

8.30 Sky

8.31 Planets

Distinguishing planets from stars through simple observation.

Observation of Plantes with the naked eye,

A simple study of our solar system.

8.32 Stor patterns.

A simple study of pathways of stars.

Introduction of Star constellations and the determination of directions using those constellations.

8.33 Universe

Introduction to our galaxy and the presence of other galaxies in the universe.

SOCIAL STUDIES

YEAR 6

6.2 Village/City

6.2.1 Physical environment of village/city

6.2.12 Topography of the area

6.2.13 Weather

Obsevation of weather conditions daily.

Temperature/Rainfall/Wind direction.

6.2.14 Natural resources of the area

Water/Soil/Vegetation/Minerals/Animals.

6.3 Physical environment of the country

6.3.2 Topography of Sri Lanka, Mountains, Plateau, Plains Valleys, Rivers, Sea coast.

YEAR 7

7.1 Location of Sri Lanka and its topographic features

7.14 Mountains and plains

7.15 Main rivers

7.2 Climate of Sri Lanka

7.3 Soil and vegetation

7.3.2 Soil and vegetation

Soil erosion, sea erosion and soil conservation

7.33 Natural vegetation of Sri Lanka, types and zones.

7.34 Importance of natural vegetations

7.35 Conservation

7.4 Natural Resources and Main Products

7.42 Minerals-clay, plumbago, gems, mineral sands, limestones, salt.

7.43 Production of hydro electricity.

YEAR 8

8.1 Main planets surrounding the sun

8.11 The position of the earth in the Universe

8.2 Earth

8.12 Origin of Earth

8.25 Composition of the Earth-Atmosphere, hydro sphere and lithosphere.

8.3 Weather and climate

8.31 temperature

8.32 Rainfall

8.33 Atmospheric pressure and wind

YEARS 9, 10, 11 - SCIENCE

YEAR 9

9.20 Weathering of rocks and soil formation

Introduction to factors responsible for soil formation.

9.22 Soil constituents

9.23 Soil erosion and conservation

Identifying the agents responsible for soil erosion

Methods to prevent soil erosion

YEAR 10

10.13.0 Balance in nature

10.13.1 The concept of elemental cycles

10.13.2 Any few elemental cycles - carbon cycle, oxygen cycle, Nitrogen cycle and mineral cycle.

10.13.3 Tendency for disruption of natural cycles by activities of man.

YEAR 11

11.10 Balance in nature

11.1.1 Species, germs community, eco-system and biosphere.

11.12 Inter-relationship between organisms and the environment mineral cycles, energy cycle etc.

11.90 Science and quality of life.

11.91 Industries based on natural resources

11.93 Environmental pollution.

11.94 Conservation of biosphere
Importance of conservation of forests
Effects of deforestation
Conservation of the sea coast

YEAR 9, 10, 11 - SOCIAL SCIENCES

YEAR 9 **TOPIC - SRI LANKA AND SRI LANKANS**

9.10 Geographical background of Sri Lanka

9.11 Its location

9.13 Topography and topographic zones

9.14 Climate

9.15 Temperature

9.16 Rainfall - distribution of annual rainfall and types of rain.

9.17 Climatic zones

9.18 Natural vegetation and natural vegetational zones (a detailed study)

9.2 Economic products of Sri Lanka

9.23 Modern water management schemes

9.3 Mineral resourfes

Types of minerals and their distribution in Sri Lanka.

YEAR 10 TOPIC - WORLD AND ITS INHABITANTS

10.1 Physical environment of the world

10.11 Topography main maintains, plains, plateau and rivers.

10.12 Climate and clamatic zones of the world.

10.13 World biomes.

YEAR 11 TOPIC - DEVELOPMENT - WORLD AND SRI LANKA

11.1 Resources in the World and Sri Lanka

11.7 Nature of the developmental efforts and associated problems in Sri Lanka

11.71 Natural resources of Sri Lanka

4.7 Environmental Education Teaching Materials

(a) Syllabi prepared for courses in the pre-service teacher training programmes in the Colleges of Education. Prepared mostly by the teacher educators of the Colleges of Education.

(b) Modules - Prepared by the teacher educators of the various Colleges of Education for certain areas of the syllabus.

(c) Course Guides - Prepared in work-shops some of which are sponsored by international funding agencies such as UNESCO and UNDP.

(d) Syllabi of the primary and secondary levels of schooling

(e) Pupil text books - Prepared by the Ministry of Education.

(f) Seminars - Special seminars for teachers and teacher educators, to disseminate information

relating to new educational ennovation at both National and International levels.

(g) **Reference material** - Published by the private sector and public sector institutions.

(h) **Use of Media** - The demand for better quality of education has led to an increased use of audio-visual aids in teaching including television programmes.

4.8 Evaluation Techniques Utilised for Training of Teachers In Pre-service Training Programmes at the Colleges of Education

A variety of procedures are employed for teacher appriaisal to determine the extent to which the objects of the course are being achieved.

The evaluation is done internally on a continual basis and externally through an examination held at the end of the second year.

Fifty percent of the marks are given for internal assessments and 50% for the final examination which is conducted by the inter collegiate Evaluation Board after the completion of the 2nd year. During the first two years internal evaluation is done in the form of:

(i) Written tests

(ii) Oral Tests

(iii) Discussions

(iv) Interviews

Somne of the more important aspects that come under evaluation are :-

(i) Projects that are continuously carried out by the students.

(ii) Personality improvement

(iii) Leadership

(iv) Participation in co-curricular activities (10% of the marks are allocated for this)

Knowledge and skills with regard to evaluation techniques also plays an important role. Students are assessed on:-

(i) abilities of observation

(ii) preparetion of observation schedules.

(iii) preparetion of good test items with validity and reliability.

(iv) Ability to conduct an examination

(v) Ability to conduct a discussion.

During the third year the students are expected to work in a school, guided and instructed by teacher educators, under the supervision of the principal and a senior teacher of the school. During this year they are expected to take part in all the activities of the school.

Assessment is made continuously on class-room teaching as well as co-curricular activities that he/she participates in school.

On completion of the third year successfully he/she will be awarded a Diploma by the National Institute of Education, and will be given an appointment by the Ministry of Education as an assistant teacher.

5.0 IN-SERVICE PRIMARY AND SECONDARY TEACHER TRAINING

In Sri Lanka there are three different types of inservice teacher training programmes.

55.1.0 Teacher Training Colleges

In Sri Lanka shortages of professionally qualified teachers to fill the vacancies that occur in various schools has compelled the Ministry of Education to appoint GCE(OL) or GCE(AL) qualified persons, as teachers directly to teach in schools. This practice has resulted in a backlog of professionally unqualified teachers within the school system. Out of a total of about 145,000 teachers nearly 300,000 are at present, not professionally trained.

Thirteen Training Colleges spread throughout the country take in teachers from this backlog every year. Presently there are about 5000 undergoing

training in these training colleges. The courses offered in these training colleges are:

(a) Primary Education

(b) Science/Mathematics

(c) Agriculture

(d) English

(e) Aesthetics

(d) Special Education

Training is formal and institutional may be residential of non-residential. The period of training of 2 years is institutional and one year of internship.

5.1.1. Method of Recruitment

G.C.E.(OL) or G.C.E.(AL) qualified persons are selected only after a written test and an interview. They are given a pre-service training of 3 weeks and are appointed to schools. After having served in a school for a minimum period of 3 years they become qualified to enter a training College depending on the availability of vacancies in different courses offered

by the training colleges.

5.1.2 Environmental Education in Training Colleges

In the Primary Education Course the environmental component is incorporated in "Environmental Studies" for secondary education it is incorporated in the subjects like Science and Health Education curricular.

For an example in the Science stream the syllabus contains the following components in environmental Education.

Unit 1 Biosphere

1.1 Organisms and their environment

- 1.11 Inter relations among organisms
- 1.12 Inter-relations among organisms and the environment.
- 1.13 Food cycles and food-webs
- 1.14 Flow of energy through food substances
- 1.15 Balance in nature
- 1.16 Natural cycles

1.2
- 1.21 Population, Communities and eco-systems
- 1.23 Animal and plant communities
- 1.25 Environmental Pollution and Solutions

5.20 Distance Education Programme

The increasing number of children seeking admission to schools and the expected annual drop-out rate of the teachers, (due to retirement, leaving for other jobs etc) demand the recruitment of new teachers annually. The training capacity of the teacher training colleges is so designed as to satisfactorily cover the annual drop-out rate of teachers, but not to eleminate the entire backlog of professionally un-qualified teachers. So inorder to cover this backlog the Ministry of Education as considered Distance Education as an alternative way of giving a professional training to untrained teachers.

Distance Education technique has been used in Sri Lanka Science 1980 at the Open University of Sri Lanka for Courses on Diploma in Education for graduate teachers and certificate courses in science, Mathematics, Management Studies, Electronics and Telecommunication, for those in employment and others who cannot devote their full time to study. For non-graduate teachers this technique began initially in 1983. This will also help to reduce per-capita expenditure on teacher/training from about Rs.8,000/- to about Rs.2000/-.

The programme is headed by the Director of Distance Education Unit. Under his supervision there

are three units:

(a) Administration

(b) Study

(c) Production

These units are responsible for carrying out the Distance Education Programme (See Chart II).

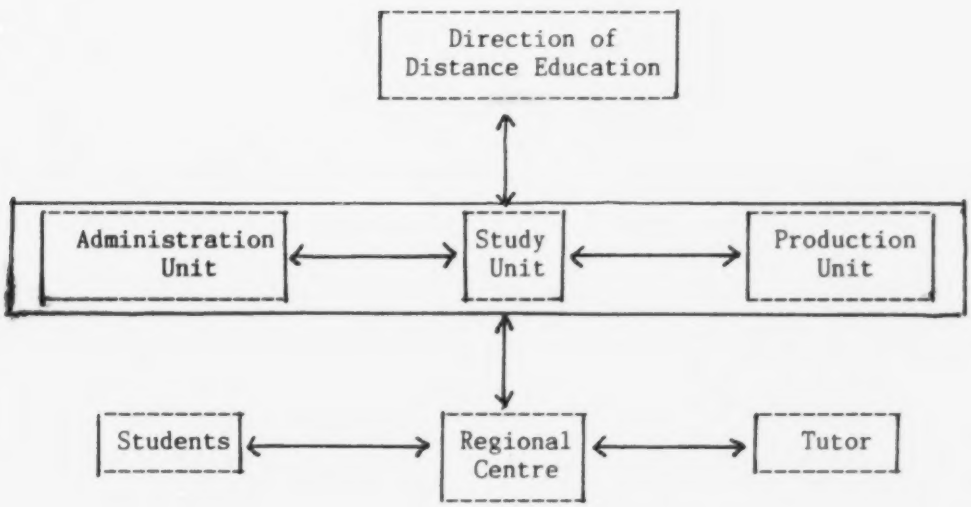


Chart II. The Distance Education System

Training of course - writers, formulating the curriculum content and editing are done by the study unit. Layout and printing are done by production unit.

In Sri Lanka, in close association with the Regional Directors of Education and supporting staff, correspondence

tutors implement the distant education activities at regional level. There are 24 regional Centres spread through out the country. Senior tutor is in-charge of each regional centre and there are three or four full time tutors and two or three part time tutors to assist his work.

The non-academic staff include a clerk, typist, laboratory assistant technician and a sanitory worker.

It is the senior tutors responsibility to invite the teacher trainees for face to face contact sessions, informing them of the work plan and maintaining contact with central unit accordingly. He is also responsible for all practical arrangements concerning these sessions. The venue of the Centre is a secondary school with suitable resources and facilities like library services, laboratories and audio visual equipments.

The courses offered under the distance education scheme are :

(i) Science/Maths

(ii) Primary Education : Teaching materials include

a) The syllabus

b) Self learning material in the form of modules

c) Face to face contact session

The duration of the Course is three years. According to the plan the student has to study three or four modules per

month. When a teacher trainee registers as a distance student he receives a set of modules scheduled for the first month, together with the student hand book. The student hand book provides the learner with the structure of distance education system and the requirements to follow the course. The trainee has the freedom to finish whatever module he likes and to send one assignment at a time to the regional centre, where the tutors will correct them.

The trainee in turn receives the corrected assignments and fresh modules. Each module has an assignment, and the marks are recorded.

The face to face contact sessions play a very important role in the trainee education. There are two-day contact session at the regional centre per term and a five day session per term during school vacation. Apart from these the tutor may contact them by paying visits to schools where the distance trainees are working. At the contact sessions the tutors motivate and guide the trainees. The guidance element in distance education distinguishes it from pure self-learning. These contact sessions enable the trainees to improve his/her knowledge, skills and attitudes towards teaching in class room.

5.2.1 Environmental Education

Out of 100 modules designed for the Primary Education Course, 20 modules incooperate the environmental component, which

amounts to 20% of the entire syllabus. These 20 modules incorperate the same 11 themes as included in the primary education syllabus.

In secondary education the environmental component is included in the discipline - Science, Health Education and Social Studies, at the school level. In the Distance Education training programme only activities based on science syllabus are being carried out.

5.30 In-service Training Conducted by the Curriculum Development Centre of the Ministry of Education

Training of teachers once and for all through one or two year courses has been found to be inadequate to meet the requirements of changing school curricula. To fill the void a systematic and regular inservice teacher education programme has been put into operation by the Curriculum Development Centre of the Ministry of Education. Seminars and workshops are held for teachers at all school levels with the following objectives :

1. To reorient teachers to meet the needs of new curricula.
2. To impart new knowledge and skills relevant to the curricula.
3. To widen the academic and professional background of teachers, especially of the untrained teachers.
4. To discuss and innovate effective

teaching and learning strategies.

5. To gather feed back information (from teachers) relevant to the Curriculum Development Programme and the inservice education programme.

The inservice training programme by Curriculum Development Centre has been the main stay of environmental education training given to teachers at Collegiate level. Seminars have been conducted with the object of imparting subject matter and methodology that can be used in the teaching of environmental components. Several media such as the television and radio have also been used extensively in these programmes. The Curriculum Development Centre on her own has produced severalk video films based on environment and environmental problems that are used for these training programmes - e.g. Forests, Costal erosion - Pollution etc.

The total inservice training programme has now established it self as a quality improvement programme of vital importance for teachers in Sri Lanka.

6.0 SUGGESTED PRIORITIES FOR ACHIEVING PRE-SERVICE AND IN-SERVICE TRAINING OF PRIMARY AND SECONDARY SCHOOL TEACHERS IN ENVIRONMENTAL EDUCATION

Environmental education, has to be considered in a holistic manner in the context of the realities of the country's

cultural and socio-economic milien. The policy decisions on all matters of education are made at the national level and these are translated into educational goals and objectives by curriculum developers. In the light of the national policies the curriculum developers should be able to clearly identify the environmental issues facing the country. For this purpose expertise should be obtained from government and non-government institutions before curriculum content be finalised.

A training programme should be conducted for educational planners and curriculum developers in environmental education, in order to make them fully aware of the environmental issues and problems in the various localities of the country. The training programmes should be organised in universities and other recognised institutions that deal with environmental research. The training programmes should be conducted in the form of workshops, seminars, discussions, field work, field trips and assignments regarding environmental problems and issues etc.

The teacher educators have the responsibility of giving the teachers a thorough training to develop competencies necessary to meet the demands of environmental education. It involves not only developing teachers knowledge but also developing teaching skills appropriate for environmental education is better imported to the learner through learning in, and through, the environment. Teachers should become skillful in providing for participatory learning by their students and conducting issue-studies as these two strategies are thought to

be highly effective in developing attitudes, in addition to knowledge skills.

It may be more appropriate to prepare teachers for environmental education through their pre-service education in teacher training institutions, laying more emphasis on environmental components in the curriculum.

The Educational faculties of Univcersities can incorporate environmental components in to these curriculum for the benefit of teachers who come for post-graduate studies.

. For teachers already in the teaching service in-service training programme must be organised.

(a) The Curriculum Development Centre can train teacher advisers selected from different educational districts in the country, and these teacher advisers in turn train teachers in the respective districts.

(b) Another method that can be adopted is a training given through self learning modules. The distance education programme in operation at the moment has such modules prepared for environmental education components. These modules could be used to train already professionally qualified teachers who had no training in environmental education.

(c) Media like the television have been extensively

ujsed for the education of GCE(AL) science students in the country. Teachers could be given a similar education through the television effectively if properly oirganised. Supplementary material could be supplied in the form of printed matter.

(d) The National Institute of Education of the Ministry of Education should Print and distribute to the relevant teachers properly organised resource material on environmental education.

(e) Institutes of higher learning such as universities can conduct short term pre-service/in-service training programmes for teachers on environmental education during university vocations.

7.0 CONCLUSION

On one hand the envrionmental problems of Sri Lanka are attributable to the current domestic, agricultural, industrial and other developmental activities, which are all heavily dependent on modern science and technology, being carried out within the frame work of a free democratic and socialist society, subject to population pressures, striving for a better quality of life. Historically, the problems are also rooted in the environmental policies adopted in the past, especially those during the times when the country came under foreign domination.

The importance of environmental awareness and the related responsibilities of all citizens has been recognized and even constitutionally enshrined in Sri Lanka. The need to educate the nation on matters pertaining to the environment is given very high priority at both formal and nonformal levels of education.

Teacher training is recognised to be a significant area for action in achieving the objectives of environmental education. A variety of strategies are being employed for this purpose. They need further experiences and improvement as do the other elements of environmental education.

Through seminars of this nature we will come to understand environmental concerns still not experienced by us, and newer approaches to environmental education.

" Knowledge shared is knowledge doubled! "

REFERENCES

Fernando, A.D. 1985, "Environmental Education in Sri Lanka", Curriculum Development Centre, Ministry of Education, Sri Lanka.

Herath, J.P 1983, Environemntal Education at School Level in Sri Lanka. Curriculum Development Centred, Ministry of

Education, Sri Lanka (Unpublished document prepared for internal discussions).

Herath, J.P. Fernando, A.D. and de Silva, N.S.R. 1983. A Study on the Position of Science Education in Sri Lanka. Curriculum Development Centre, Ministry of Education, Sri Lanka.

Karunaratna, S. 1985. The Role of Distance Education in Teacher Tranining. Thesis prepared for Master of Education, School of Education, lUniversity of Bristol.

Samarakoan, M. 1985. An Overview of Environmental Problems and Strategies for Protection and Management of Sri Lanka's Environment. Central Environment Authority, Sri Lanka.

MAJOR ENVIRONMENTAL PROBLEMS IN THAILAND

By

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Introduction

This country report was prepared for the Sub-Regional Seminar on Teacher Training in Environmental Education For Asia at Universiti Pertanian Malaysia sponsored by UNESCO-ENEP International Environmental Education Programme (IEEP).

This report focuses on the major environmental problems of Thailand and the measures taken for solution and preventation, and is especially concerned with the continuing role of environmental education at all levels, both formal and informal, for school children and the general public. Particular attention was given to the discussion of strengths and weaknesses of the existing curriculum for teachers, both in pre-service and in-service programs. Current issues and developments in environmental education were discusses in terms of their implementation and feasibility.

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MAJOR ENVIRONMENTAL PROBLEMS IN THAILAND

Like other Asean countries, Thailand has adopted industrialization as the path to rapid economic development. A broadening of the industrial base has led to a significant increase in the output of manufactured products. Problems have arisen, however, from the unplanned location of industries and industrial pollution. Furthermore the characteristics of these industries are quite different from those in developed nations. They are the so-called informal industries, and, more often than not, they do not follow the organized pattern of industries in the west.

The socioeconomic situation in Thailand makes it easier for entrepreneurs to get into industry by starting small. Moreover, as the conditions in big cities in Thailand provide advantages in infrastructure and proximity to markets, production tends to be concentrated there. This is especially the case in Bangkok.

There are several problems that have prevented the effective abatement of pollution to these small industries. The industries are usually situated in already congested urban centres with no long-range project planning. Being small, they are incapable of taking advantage of "economic of scale" and tend to maximize overheads and "unnecessary" expenditure. They usually operate on limited capital that is barely sufficient to puchase raw materials and other necessities. Thus any

requirement for capital investment on "non-productive" items such as pollution control equipment would upset the cash flow of such companies.

In Thailand the large-scale industries are usually those involved in the processing of agricultural produce such as rubber, palm oil, copra, casava roots and sugar cane. Although the technology for pollution control is readily available, strict enforcement of law is necessary to control pollution from these industries. These laws, however, are largely based upon foreign models and are often questionable as to their appropriateness in a country like Thailand, which is so different politically, socially and culturally. Also, the ability of Thailand to develop what might be called an "environmental jurisprudence" is limited. There are few indigenous lawyers who have been trained in modern legal mechanisms for maintaining environmental standards. It is now recognized that the law is a important tool to be used not only for the control of pollution from industries, but also for the preservation of environmental quality in general. By the same taken, the Asean region is, overall, in need of new legal instruments at not only national level, but also at regional and international levels. After all, pollution knows no boundaries.

Environmental degradation in urban areas of Thailand is another urgent problem that requires attention by government. In the metropolitan areas the rates of population increase have

been higher than the national average due to a steady stream of rural-urban migrants. By the year 2000 it has been estimated that Bangkok's population will be at least double the present figure of 5 million. Even at present, the cities in Thailand are experiencing a widespread shortage of housing which leads to the expansion of slums and other forms of marginal settlement. This in turn has sharpened the existing glaring social and economic disparities, while urban industrial and commercial activities are unable to generate enough jobs for all these largely unskilled rural migrants.

Congested sub-stand living places, coupled with inadequate facilities in terms of water supply, drainage, sewarge and sewage treatment and refuse collection and disposal, help create environmental health hazards. The city's productivity is also cut down by traffic congestion which gives rise to further problems of air pollution. Moreover, Bangkok, the Capital City, also has the added problem of periodic flooding during the rainy season.

Turning away from the environmental problems created by industries and human settlements, another important problem which needs to be solved is that of the depletion and degradation of natural resources. Thailand is well endowed with natural resources such as tropical rain forests, rich marine food resources of the coastal zone and mineral deposits. All of those resources are threatened and endangered by both mismanagement and

the sheer increase in population. In other areas poor rural people confronted with starvation because of the lack of land for cultivation are forced to cut down and burn forest to create dwelling space and to grow crops. Illegal logging by greedy and wealthy people has aggravated the sitution even further. At present, the forest area has been reduced from more than 50 percent of the total land area to less than 28 percent, with about one million hectares being denuded annually.

In Thailand, the fishing industry comprises 4 percent of the gross domestic product. In addition it has stimulated the growth of related economic activities. However, recent rapid expansion in the fishing industry has led to the overexploitation of marine resources so that the fish catch is at present declining.

The few environmental issues cited above are far from exhaustive but they should at least highlight some of the major issues which are confronting Thailand and should serve as reference for the analysis of the environmental education programme now being offered at various institutions of higher learning within the country. However, to give a more complete survey of environmental interest in Thailand and the Asean Region, it is best to quote the list of peiority areas adopted by the Meeting of the Asean Experts Group of Environment, in Jakarta in December 1978. The area which have been incorporated in the Asean Environment Programme (ASEP) I are : Marine Environment, Environment Management including Environmental Impact Assessment,

National Conservation and Terrestrial Ecosystem, Industry and Environment, Environmental Education and Training, Environmental Information Data and Remote Sensing.

The remaining task of this country report is now to analyse the environmental education programmes presently offered in Thailand, especially in the elementary and secondary schools and teacher training colleges to see their conceptual framework and how these programmes respond to the needs of the country, and whether they could be modified in the light of the guiding principles which are now generally accepted.

NATIONAL POLICY ON ENVIRONMENT AND ENVIRONMENTAL EDUCATION

Statements incorporated into the Constitution of Thailand indicate awareness and concern about environmental problems e.g. under Section 65 of the Constitution of October 1974 it is stated that "the State shall maintain the balance of the environment and eliminate pollution that is damaging to public health". In 1975, the Improvement and Conservation of National Quality Act was promulgated and the National Environment Board (NEB) was established. The environmental development policy drawn up by the NEB comprises six chapters: General, Management of National Resources, Pollution Control, Population Distribution, Conservation of Nature and Environmental Education.

As a part of a combined effort to promote environmental quality, environmental educational activities have also been planned. In the Thailand National Educvational Scheme 1977, it

is stated under Section 6, Item 52 that "The State shall undertake to inculcate the awareness of the importance of conservation of natural resources and environment as well as population education".

Curriculum for Environmental Education

For the purpose of curriculum development environmental education has been interpreted as "a learning process to create an awareness of the importance of conservation of material resources and the environment, and to induce responsible behavior towards such conservation".

Elementary (Primary) Grade (I - VI)

An integrated approach is adopted towards environmental education, combining it in the areas of social studies and science. Contgents relating to environmental concerns at the lower secondary curriculum level are also listed according to grade. At the upper levels, environmental education is included in a manner similar to the lower secondary stage, both by integration in the subject areas and by elective courses in social studies.

Environmental Education in Teacher Education and University

The position regarding teacher education is stated as follow :

"There is no special training for teachers of environmental education at the certificate level. In the pre-service teacher training programme elective, environmental science courses are offered under general science. Graduate studies in environmental studies is provided at universities, such as Kasetsart, which offer an M.Sc. programme in environmental science, and Mahidol University, which has two master's degree programmes. One of these is an M.Sc. in Technology and Environmental Management, offered by the Faculty of Environment and Research Studies; the other is an M.Ed. in Environmental Education, offered by the Faculty of Science and Humanities. For the elementary and lower-secondry levels no special training in environmental education and out-of-school curriculum is considered necessary for teachers who are teaching this subject in an integrated form. The teacher's guide and some in-service training on the teaching-learning process are considered adequate at present".

In additon to the pre-service and in-service programmes for teachers, a teacher's manual and a source book for conservation of Resources and the Environment has been prepared by the Ministry of Education to help teachers deal more effectively with the new content.

An examination of the aims, objectives, content and

instructional methodology of the environmental education curriculum materials of Thailand reveals certain characteristics such as the following:

- environmental education concepts are integrated into the entire system of education at all levels of the educational system from primary school to the senior secondary school level.
- an interdisciplinary approach is adopted at the primary level.
- a multidisciplinary approach is adopted as the secondary level.
- a holistic perspective encompassing the physical, ecological, social, cultural and other aspects of the problem is adopted.
- in addition to the knowledge component (cognitive domain), the need to include skills (psycho-motor domain) and attitudes and values (affective domain) is also recognized.

An observation can also be made that Thailand has adopted the strategy of "infusing" subject matter relative to the environment into various disciplines of the existing curriculum in an attempt to integrate the environmental dimension with general education. This has resulted in the emergence of a multidisciplinary approach, which is evident particularly at the

post-primary level. Of the existing curriculum subjects, natural and social sciences have had the benefit of absorbing the largest share of environmental concepts in this infusion approach.

Activities and Strategies at Grassroot Levels

At present, environmental education components have been integrated into school and university curricula in Thailand. However, lack of trained teachers and teaching materials, including audiovasual materials, have hindered the effective implementation of the new curricula. The Ministry of Education and the Office of the National Environment Board, recognizing the need for trained teachers, have been steadily conducting in-service training courses for teachers of environmental education, in addition to producing posters tape and slide series and other "awareness" materials. Morever, mobile educational units have been sent out to schools all over Thailand in an effort to organize environmental exhibitions and related activities. At least one school in each of the 73 proviness of Thailand has hosted an exhibition which, to date, has been seen by over 270,000 students.

One of the most innovative approaches for promoting awareness at the village level involved the organizing of a seminar for volunteer monks. So far, about 100 abbots from the Upper North, where the deforestation is taking place at an alarming rate, have attended the three-day seminar. At this

seminar they learned to understand the facts about the environment in their region and their impact upon the socio-economic life, as well as the effective strategies which they could use to help improve the quality of the environment.

Future Direction

With a population growth at the rate of over one million each year, leading to an expected doubling of population within the next 20 years or so, environmental problems which are closely related to population size have gained more and more attention from the government as well as the general public. In the out-of-school sector, the emphasis is on environmental problems, due to the detrimental effects of the development process. For in-school education, more emphasis is expected to be put on the individual's interaction with his environment, and on responsible participation in community activities to preserve and conserve environmental conditions.

A recent development which concerns environmental education is the recommendation proposed by participants of a Seminar on the Importance of Energy and Food Policy to National Servival, organized by Mahidol University in September 1980. The recommendation states that "The State must campaign vigorously to make people realize the n ecessity of saving energy and food, utilizing all forms of education and mass communication...." Later, such a recommendation was approved by the Cabinet. As a

consequence, this recommendation has became the area to be emphasized in the programmes of both today and tomorrow.

Some Problems and Issues in Environmental Education

Like other developing countries in Asia, Thailand has been confronted with fundamental problems in adapting concepts and materials on environmental education. These have been developed mostly in the industrialized countries which make their transfer to other cultural and environmental situations difficult. Since environmental education is to a great extent concerned with the problems of one's own environment, the implementation of a curriculum designed for an industrialized country will not easily suit the needs of a developing country like Thailnd. A translation of basic source books prepared by UNESCO in environmental education needs to be translated into Thai because in Thailand English is not their second language. This is not because of only language difficulty but also cultural differences as well.

Since environmental education is value-oriented, teachers and pupils may also come up against contradictory views, policies, and practices regarding value matters. Some ideas and values which are valid for industrilized countries may not be valid for developing countries. One may also be confronted with the conflict between accelerated national growth and development and environmental protection in the developing world. All these

issues suggest that much care has to be exercised in dealing with values and attitudes in the teaching of environmental education.

An important aspect of Environmental education which has not been developed to date is the evaluation of learning and teaching. Evaluation of environmental education is a complex process for which the approaches, methods and strategies, and the tools and techniques conventionally used in general education are quite inadequate. Hence new methods and strategies are needed. In addition to methods and techniques, certain radial changes are also needed in the attitude which educational institutions have towards evaluation, where emphasis is given to individual achievement predominently in the cognitive domain. Attention needs to be paid to the evaluation of skills, attitudes and values, and activities such as community-oriented field projects.

Teacher education programmes in Thailand are also found to lag behind the curriculum changes in environmental education. The pre-service training in environmental concepts provided for teachers is mostly restricted to a few conventional subjects. The limited experience and insights gained with such exposure cannot be expected to provide them with competencies to adopt the expected interdisciplinary approach to teaching environmental concepts at school level. The training also appears to be casual and theoretical in nature. The in-service education courses specially designed to meet the actual curricular needs seem to be more effective than the pre-service because they can be flexible, and free from the constraints which characterize the rigidly

institutionalized pre-service training.

Reference

Surin Setamanit, Curriculum Conceptualisation in Environmental Education at Tertiary Level, Issues in Environmental Education in Asean, RIHED-FNS Studies in Environmental Education, Arun Batasubra maniam (Editor) Regional Institute of Higher Education and Development, Singapore 1985.

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